1998

Perceived benefits of selected experiential learning activities and quality of instructional techniques in a college of agriculture capstone course

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Perceived benefits of selected experiential learning activities and quality of instructional techniques in a college of agriculture capstone course

by

Randall James Andreasen

A dissertation submitted to the graduate faculty

in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Agricultural Education

Major Professor: Larry D. Trede

Iowa State University

Ames, Iowa

1998

Graduate College
Iowa State University

This is to certify that the doctoral dissertation of

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CHAPTER I. INTRODUCTION

Educational reform in the United States is a constant, on-going process. New ideas and models are constantly espoused which are intended to dramatically improve education. Often these revolutionary ideas are not new and, in fact, may have been around for centuries. One of these "new" ideas involves experiential learning.

The concept of experiential learning has been around for a long time. About 340 B.C. the Greek philosopher Aristotle postulated the idea that knowledge comes from experience. This was in contrast to the view of Plato, his mentor, that knowledge is based upon the reasoning process. Plato, and earlier Socrates, both supported the philosophy of pursuing truth through questions, answers, and additional questions. These two views of knowledge (education) are still present in today's society. They are represented by the empirical view (Aristotle) and the rational view (Socrates and Plato).

John Dewey is considered by many to be the founder of experiential education. His book *Experience and Education* (1938) helped define the role of experience in learning. Dewey explained that experience does not take place solely in the individual, but also within the environment of that individual. This novel approach to looking at experiences and experiential learning has since been adopted by a number of educational reformers (Kraft, 1995; Piaget, 1971; Lewin, 1951).

Education in and about agriculture, which had always been largely experiential, took on a more organized format with the passage of the 1862 Morrill Act. This Act established the land-grant system of colleges. With the passage of the 1907 Nelson Amendments to the Morrill Act, which set educational standards for agriculture, the stage was set for the training of agriculture teachers. At that time agricultural education still consisted of mainly experiential learning through

field trials, crop and livestock demonstrations, and hands-on activities. In 1917 the Congress of the United States passed the Smith-Hughes Act which earmarked federal funds for the establishment of vocational agriculture programs in public schools. The purpose of these programs was to train young people to work in production agriculture, again a largely experiential undertaking.

The founding of the Future Farmers of America (FFA) in 1928 marked the beginning of a new era in vocational agriculture and in the training of "future farmers." Found in the words of the FFA motto is the modern day interpretation of the empirical view of experiential learning: *"learning to do, doing to learn...."*

The Carl D. Perkins Act passed in 1984 reiterated the experiential aspects of previous legislation by stating that agricultural education include basic employment competencies as well as basic problem-solving skills. Recent initiatives such as the 1994 School-to-Work Opportunities Act have supported what we have known all along: that learning is best accomplished through actual experience.

The National Council for Agricultural Education's (The Council) report, *Reinventing Agricultural Education for the Year 2020,* includes the following mission statement: "...utilizing a proven educational process that includes...*experiential learning*..." (p. 4). Such initiatives and reports give credence to the age old methods which have been used to teach subjects such as agriculture. The resurgence in the popularity of these methods necessitates closer scrutiny if we are to learn from the past and apply what's best to the future.

Capstone courses offer a viable option for addressing the concerns of providing a setting for the infusion of experiential learning. The Association of American Colleges (AAC) recommends the inclusion of capstone courses throughout all collegiate disciplines and should be a regularly required course "pulling the disparate pieces of student's work together" (AAC, 1990, p. 17).

The concept of capstone courses is relatively new. In 1983 the National Commission on Excellence in Education came out with its report *A Nation at Risk: The Imperative for Educational Reform.* This report emphasized the necessity for

renovating the current educational practices at the elementary, secondary and post-secondary levels. While not specifically mentioning capstone courses, the assumption can be made that they address the issues posed by the Commission.

Statement of the Problem

The problem addressed by this study is the identification of the experiential and educational activities appropriate for capstone level courses as well as the effective utilization of capstone courses in an experiential learning environment. These junior/senior level courses attempt to provide a summative exercise for students where they can apply their previously gained educational knowledge and insight to solving "real time" problems (Crunkilton et al., 1997). Capstone courses have long provided problem-solving, decision-making, and experiential learning opportunities for their participants but these opportunities are often taken for granted by both students and administrators alike.

The Iowa State University Department of Agricultural Education and Studies (AgEdS) maintains a teaching farm that provides junior and senior level students from a variety of departments within the College of Agriculture with hands-on farm management opportunities. The farm is used as a laboratory in a course entitled AgEdS 450 Farm Management and Operation. The self-sustaining farm, where this class is held, is known as the Ag450 Farm. As a capstone course, AgEdS 450 has long provided problem-solving, decision-making, and experiential learning opportunities for its students.

The opportunities afforded through capstone courses are often overlooked by proponents of educational reform. Until now, there have been few efforts made to quantify the real-world value of experiential learning in a capstone course and to obtain the input of the completers of these courses as to how the learning activities and instructional methods utilized in a capstone course might be improved.

Purpose

The purpose of this study was to determine the perceptions of graduates from capstone course completers regarding the experiential learning activities associated with the course. A secondary purpose was to determine the practicality of these activities as applied to students' agricultural careers. This study further sought to establish relationships between the use of experiential learning activities and methods of instruction.

Objectives

The objectives of this study were to:

1. Describe the characteristics of capstone course completers.
2. Identify perceptions of program completers regarding selected educational concepts used in the capstone course.
3. Determine the quality of selected learning activities and instructional techniques by capstone course completers.
4. Identify strengths and weaknesses of a capstone course as an experiential learning resource.
5. Develop a model of experiential learning in capstone courses.

Need for the Study

In an effort to assess the educational benefits derived from experiential learning activities in capstone courses by the course completers, continual monitoring is needed. Surveying former participants of a course allows an understanding of the applicability of selected instructional methods. This information will be useful in guiding the instruction of the capstone course, AgEdS 450, as well as provide valuable information that will insure that this course continues to meet the needs of its graduates.

Data gathered concerning achievement of course objectives and the benefit of student experiences provide useful information which, according to Byler and

Williams (1978), enhance course evaluation and allow for changes to be implemented leading to increased student satisfaction. Additionally, the results of alumni surveys allow an organization to better prepare its graduates (Heilberger, 1996).

This study also provides a data base of information on the impact of experiential learning in capstone courses on the careers of its graduates. Also, it allowed for comparisons to be made among groups of students and selected demographic variables aiding in the pro-active planning for future sections of this capstone course.

Educational Significance

The findings of this study will increase the understanding of the usefulness and applicability of experiential learning in a capstone course, as well as the agricultural careers of its former participants. This study will add to the body of literature in agricultural education concerning experiential learning by providing insight into its appropriateness in college level capstone courses. Additionally, this study should aid agricultural education instructors in designing capstone courses and facilitate the inclusion of experiential learning activities into the curriculum. Finally, those in positions of authority in the Iowa State University Agricultural Education and Studies Department, will be able to use this study to guide their decisions concerning the department's capstone course, AgEdS 450. An experiential learning model will be developed with direct applications to agricultural education further assisting the instructors of this and other courses in designing appropriate teaching and learning activities as well as course content.

Definition of Terms

A list of terms is compiled with their accompanying definitions. The definitions are not meant to be all inclusive but rather to acquaint the readers with the operational context with which they were used in this research.

Experiential Learning - The effective use of experience in an educational setting which is complimentary to the desired educational outcomes. A structured period of reflection and discussion must occur to aid in the assimilation of the experiences.

Capstone Course - A culminating class taken prior to graduation which acts as a bridge between the students' career goals and their previous courses. It requires the synthesis of this previously gained knowledge and the evaluation and application of it into real world situations.

AgEdS 450 - A course administered by Iowa State University's Agricultural Education and Studies Department which is a capstone course for College of Agriculture juniors and seniors allowing them the opportunity to apply previously gained knowledge to the management and operation of a working farm.

Ag450 Farm - The self-supporting farm operated by the Agricultural Education and Studies Department at Iowa State University which serves as a farm management laboratory for students enrolled in AgEdS 450.

Course Completer - A student having taken and passed AgEdS 450 at least one semester and having graduated from Iowa State University.

Summary

There is the constant need for monitoring course content and the applicability of that content to the clientele base. The purpose of this study is to survey former participants of a capstone course regarding the experiential learning activities associated with the AgEdS 450 course, and to determine the practicality of experiential learning activities as applied to student's agricultural careers. The findings of this study should prove beneficial in guiding the instructional activities of this and other capstone courses and will ensure that the experiential learning activities contained within them are germane.

CHAPTER II. REVIEW OF LITERATURE

Introduction

The ability to learn is inherent in every human being. As our educational needs increase, in general, our ability to learn also increases. This knowledge is continuously gleaned from the experiences to which we are exposed and in which we take part (Kolb, 1984). Skills prerequisite to the acquisition of knowledge play a large part in our ability to learn and to make this learning affective in our lives. Kolb points out four different kinds of abilities needed by the learner: *concrete experience*; *reflective observation*, *abstract conceptualization*, and *active experimentation*. The ability to involve one's self in specific experiences, to reflect and conceptualize these experiences, and then to take an active role in experimenting and building upon them, is the foundation of experiential learning (Joplin, 1981; Kolb, 1984).

Experiential learning, as well as problem-solving and decision-making abilities, has continually been touted as an essential element in the education process. The 1991 Secretary's Commission on Achieving Necessary Skills (SCANS) Executive Summary Report includes the following statement: "We believe, after examining the findings..., that the most effective way of learning skills is 'in context', [and] placing learning objectives within a real environment..." (p. xv).

In The National Council on Agricultural Education's 1996 Strategic Plan for Agricultural Education, Goal 7, which stated is "to elevate and extend our standards of excellence in classroom and laboratory instruction, supervised experiences and student organizations" (p. 9) is to be accomplished through experiential learning. It states, "Work-based learning through agricultural-related supervised experiences should provide practical, real-world experiences in agriculture, develop a positive work ethic, and meet realistic occupation expectations" (p. 9).

This experiential learning approach has provided the backbone of the FFA program since its inception. The FFA motto, "Learning to Do, Doing to Learn, Earning to Live, Living to Serve," embodies this experiential learning concept, as does the Supervised Agricultural Experience (SAE) program of the FFA. The problem-solving approach used in agricultural education as the mainstay of the discipline is very similar to Kolb's work (Kolb, 1984), which was in turn based upon the earlier works of John Dewey (Dewey, 1936).

Alumni surveys have been widely used to assess educational outcomes (Heilberger, 1996). If programs and curricula are to be kept on the cutting edge of technology, then serious scrutiny needs to be placed on enhancing the educational opportunities of its constituents. The results of alumni surveys allow an organization to better prepare its graduates (Heilberger, 1996). Gaining employability, job satisfaction, relevance of education to current job, usefulness of training, job satisfaction, salary level, and educational attainment are all examples of how alumni surveys have been used in the evaluation of educational programs (Adams, 1993).

According to Byler and Williams (1978), data gathering instruments provide useful information which enhances course evaluations concerning the achievement of course objectives and the benefit of student experiences. Alumni surveys are one method of obtaining information from the former participants in a course or graduates of a program. The results of which can be utilized in increasing the effectiveness of teaching and learning activities which in turn better prepare future course completers (Heilberger, 1996).

This review of literature includes sections on experiential learning, capstone courses, Ag450 Farm and the AgEdS 450 course. Further, it will show the connection between these concepts and seek to provide a justification and rationale for the inclusion of the complete sequence of activities in experiential learning into capstone courses.

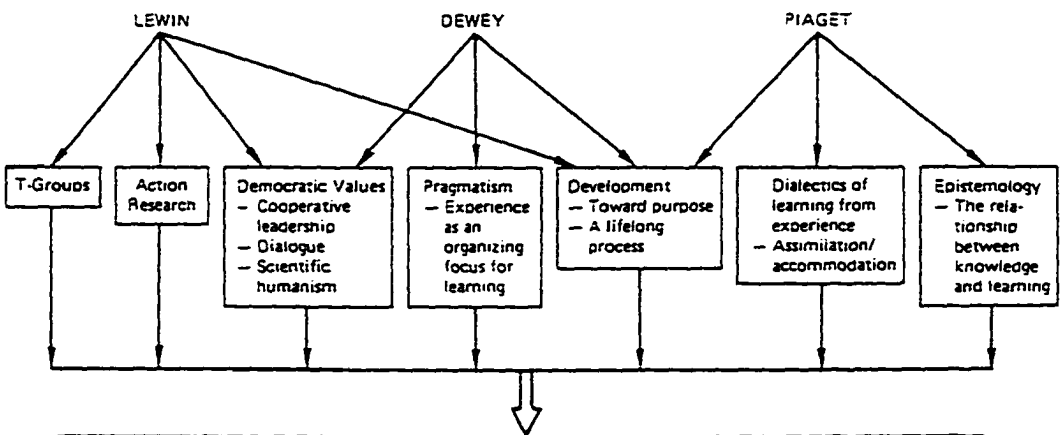
Experiential Learning

While John Dewey laid the philosophical framework for experiential learning over a century ago, only recently has experiential learning begun to find its way back into focus in public education. National movements such as the National Goals for Education for the Year 2000, New American Schools Development Corporation, National Service Act and the formation of the Corporation for National and Community Service and most recently the School-to-Work initiative have all given credence to the necessity for including experiential learning into schools and colleges of the United States (Conrad & Hedin, 1995; Kraft, 1995).

Simply stated, experiential learning is learning through experience. This is the most common definition utilized in the literature (Charalambides, 1984; Garkovich, Bunch, & Davis, 1992; Leske, 1994; Stone, 1994; Wulff-Risner & Stewart, 1997). While there exist valid reasons for incorporating experiences into the curriculum and educational programs, to truly be labeled *experiential* careful adherence to the principles of experiential learning must be a prerequisite. These guiding principles have been carefully researched and examined by these as well as other scientists in the behavioral sciences.

From the review of the literature, it is apparent that two very distinct views and definitions of experiential learning are present in today's society. One definition focuses on the inclusion of any experience or activity into the curriculum and the other definition including a structured debriefing or reflective period within the experiential activities. Both camps espouse the virtues of providing experiences for the development of ideas and concepts in educational settings, but one group goes a step further in its definition of this concept by the inclusion of a structured reflective or debriefing period. This increased or expanded view of experiential learning takes place in a structured reflective period (Joplin, 1981; Leske, 1994; Stone, 1994) and is essential if experiences are to be converted into higher order cognitive levels.

David Kolb (1984), in his book *Experiential Learning: Experience as the Source of Learning and Development,* summarizes seven themes which provide the theoretical framework for experiential learning. Kolb draws upon the works of Kurt Lewin, John Dewey, and Jean Piaget in forming guiding principles of experiential learning theory (Figure 1).



CONTEMPORARY APPLICATIONS OF EXPERIENTIAL LEARNING THEORY

Social Policy and Action	Competence-Based Education	Lifelong Learning and Career Development	Experiential Education	Curriculum Development
Access and influence on the symbolic/ technological culture for: – Minorities – The poor – Blue-collar workers – Women – Developing countries – The arts	– Assessment of prior learning – Assessment centers – Competence-centered curricula	– The nonuniversity education industry – Adult development programs in higher education – Integration of learning and work	– Co-op education – Internships – Simulations – Experiential exercises – On-the-job training/learning	– Implementation of Bruner's manifesto: "Any subject can be respectably taught at any level."

Figure 1. Guiding themes for experiential learning (Kolb, 1984)

Lewin's work with T-groups and action research articulate with John Dewey's work concerning the democratic values guiding experiential learning as well as the view of experiential learning as a life-long process. These views work in concert with Piaget's contributions of the learning process as a dialectic between assimilating experience into concepts and accommodating concepts to experience.

Dewey's unique work with pragmatism as well as Piaget's epistemology round out the themes for the principles of experiential theory.

Currently there are many models of experiential learning. Most of these models are very similar. However, they all can be directly related to the traditional theories of Lewin, Dewey, and Piaget. The Lewinian model (Figure 2) is a four-stage cycle which flows from a concrete experience through observation and reflections to the formation of abstract concepts and generalizations which can then be synthesized into new individualized theories and tested for applicability and then formulated into new concrete experiences and the cycle repeated.

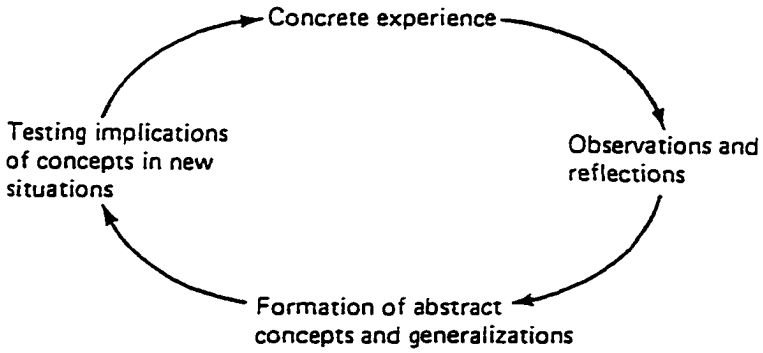


Figure 2. The Lewinian experiential learning model (Lewin, 1951)

The Piaget model (1971)(Figure 3) builds onto the concepts presented by Kurt Lewin. Lewin believed that the learning process was a cyclical interaction between the individual learner and his/her environment. Lewin proposed that the key to learning lies in the interaction between accommodating and assimilating experiences into higher levels of cognitive functioning.

The model proposed by David Kolb (1984) builds upon the works of Lewin, Dewey and Piaget (Figure 4). This model depicts learning as a series of transitions among four adaptive modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The four quadrants of Kolb's model deal with the processes whereby knowledge is transformed through experience.

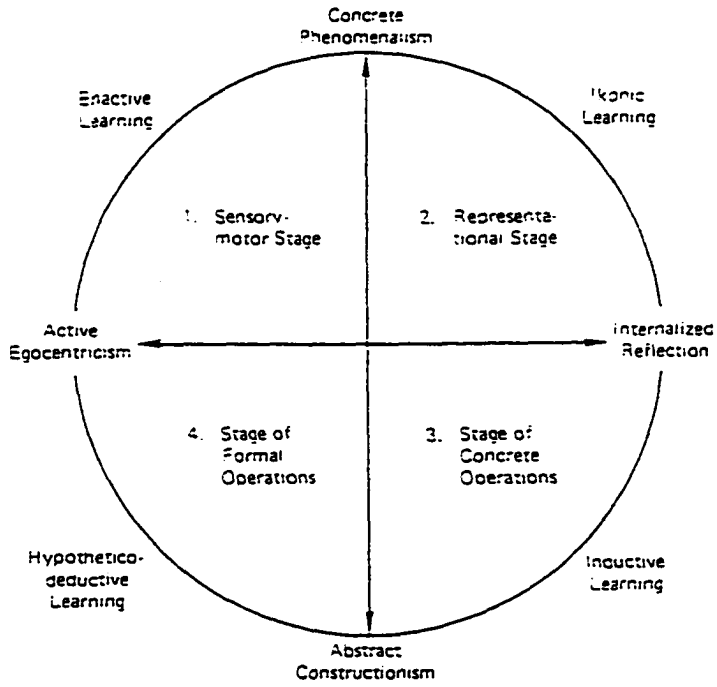


Figure 3. The Piaget model of learning and cognitive development (Piaget,1971)

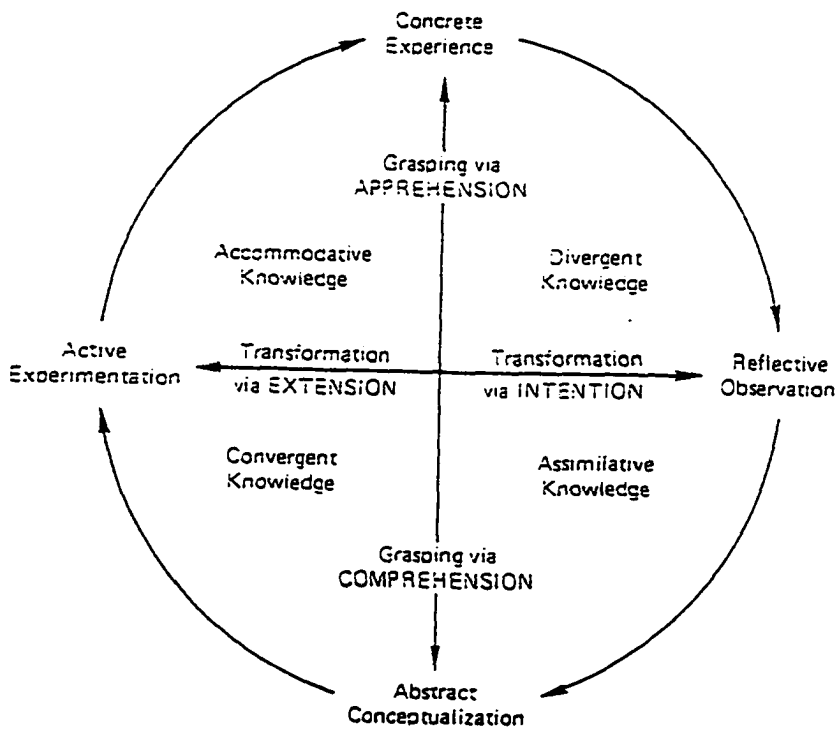


Figure 4. The Kolb model of experiential learning (Kolb, 1984)

Kolb explains that knowledge results from "the combination of grasping experience and transforming it" (p. 41). The knowledge, then, is transformed either through intention or extension and grasped either by comprehension or apprehension. In concrete experience, new content is introduced through new experiences. In reflective observation, the content is presented through a variety of methodologies. The learner then contemplates and reflects upon them before moving to the abstract conceptualization mode. In this mode the learner creates concepts and forms them into generalizations. These concepts and generalizations are then used to make decisions, solve problems, and applications in the active experimentation mode.

Laura Joplin (1981) developed a five stage model (Figure 5) which directs the experiential learning cycle. The Joplin model is also a cyclical one with definite starting and ending points. The cycle begins with a *focus* stage where the educational objective is explained, but not too specifically. Next the learner is placed in a stressful situation where the problem must be addressed. This is the

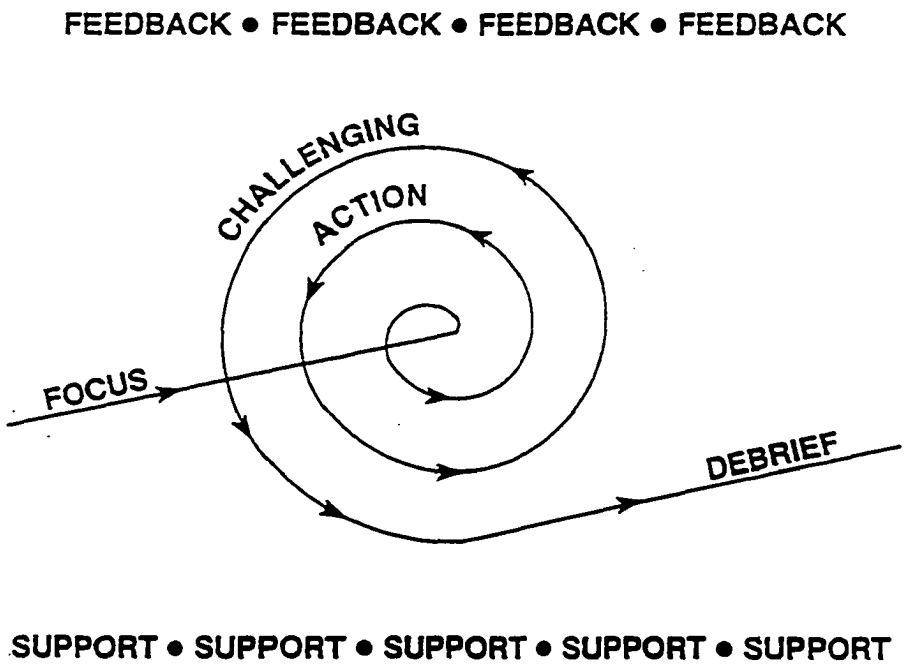


Figure 5. The Joplin model of experiential learning (Joplin, 1981)

challenging action stage. *Support* and *feedback* stages occur for the duration of the process which provide security and information to the student about what they have been doing. And a *debriefing* stage, the last stage, follows which allows for the sorting and ordering of information which may, in turn, lead to the next five-stage cycle.

Yet another popular model of experiential learning is found in the U.S. Department of Agriculture's Cooperative State, Research, Education and Extension Service 4-H Program (Figure 6). This model is an adaptation of the Pfeiffer and Jones (1977) model (Figure 7) which is also cyclical in nature and begins with the *experiencing* of a concrete activity and cycles through the subsequent steps of the model. The learner becomes involved in an activity with this initial experience forming the basis for the entire process. The next phase is

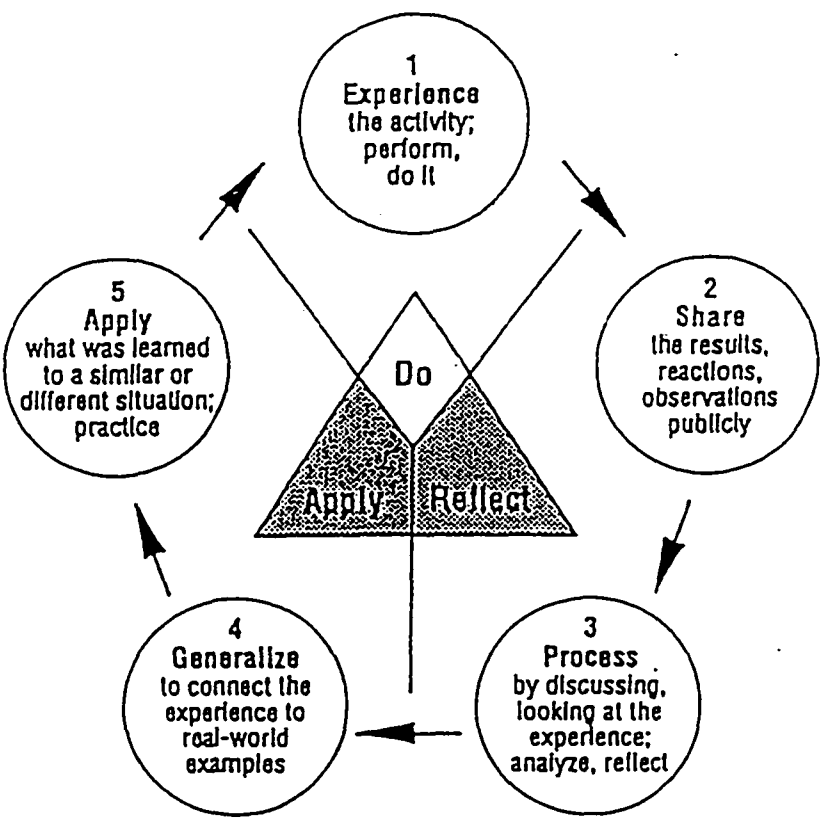


Figure 6. The Experiential learning model used by the CSREES (1994)

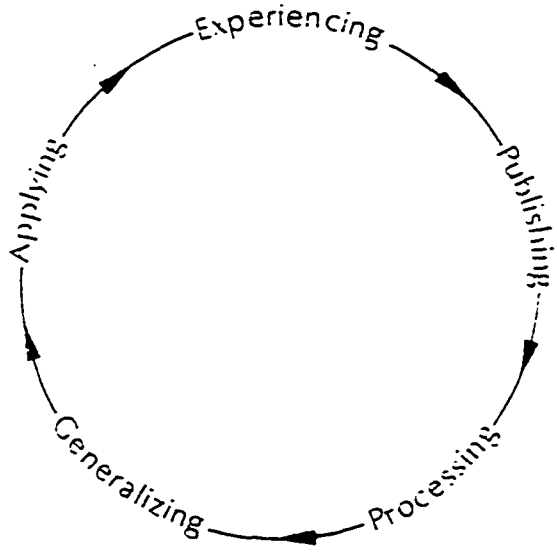


Figure 7. Pfeiffer and Jones model of experiential learning (1977)

publishing. This refers to the learner sharing or "publishing" the observations with others who have experienced the same activity. This phase is followed by *processing.* After the observations are shared and integrated, then they are processed or reflected upon. Next, the *generalizing* phase is utilized to define, clarify, and elaborate on the learner's experiences. The final step is *applying* the results of the experience in a novel setting or to a situation. The application of this new experience in itself begins the cycle anew.

The Cooperative Extension Service 4-H Program combines many of the aspects of the Pfeiffer and Jones (1977) model which used the works of Tannenbaum and Schmidt (1973). The central triangle in this model is a truncated version of Kurt Lewin's model, while the outer circle contains basically the same elements as the Pfeiffer and Jones model, except that *publishing* is renamed *sharing.* This model, as well as Kolb's model, provides the theoretical framework for many of the CSREES publications (Horton & Huthinson, 1997; CSREES, 1992).

Capstone Courses

In 1985, the Association of American Colleges (AAC) published its report entitled *Integrity in the College Curriculum: A Report to the Academic Community.* This report addressed concerns about the decay in the quality of the Nation's Colleges and Universities. The findings support a minimum required curriculum which should include the following items: inquiry, literacy, understanding numerical data, historical consciousness, science, values, art, international and multicultural experiences, and, study in depth.

The study in depth area noted the following: a central core of theory and method, a range of topics, a sequence with advancing sophistication, and a means by which final mastery of a discipline's complexity can be shown and assessed (Wagenaar, 1993). This description forms the basis of what a capstone course is.

In 1993 an entire issue of *Teaching Sociology* was dedicated to the topic of capstone courses. While individual adaptations of capstone courses varied among the authors, the required elements of what a capstone course should contain remained constant. Wagenaar (1993), in *Teaching Sociology,* summed up the collective responses by stating:

> The introductory course exposes the student to the basics of the discipline. The capstone course revisits these basics; it asks students to interconnect them, to assess which aspects really are the most basic, to compare the basic questions in (sociology) with the basic questions in other disciplines, to determine how their exposure to (sociology) contributed to their liberal education and to their critical thinking capacities, to state how their exposure to (sociology) has affected their values and their views of life, to explicitly link knowledge gained from one (sociology) course with that gained in another, and to participate competently in a discussion of the basic arguments in the field. (p. 211)

In a recent study of capstone courses by Crunkilton, Cepica, and Fluker (1997), the authors offer the following definition of a capstone course: "A planned learning experience requiring students to synthesize previously learned subject matter content and to integrate new information into their knowledge base for

solving simulated or real world problems." In order for a course to be considered a capstone course certain outcomes must be achieved by the learners. These outcomes follow a familiar pattern. The basic theme among all experiential learning models is that learning through applicable experiences, with requisite reflection and synthesis, provides for the best education (Kolb, 1984; Joplin, 1981). It is this experiential learning model which provides the backbone for a capstone course.

Crunkilton et al. (1997) go on to state that a capstone course should "...ease the transition of students between their academic experiences and entry into a career or further study." The course provides a culminating experience which needs to be carefully monitored so that students achieve their stated objectives (Knowles & Hoefler, 1995; Aupperle & Sarhan, 1995).

Six educational outcomes and five required learning activities were identified by Crunkilton et al. (1997). The expected educational outcomes of a capstone course include: problem solving; decision making; critical thinking; collaborative/professional relationships; oral communications; and written communications. Required learning activities include: projects, case studies, or written analyses, small group work, oral communication, intensive writing, and industry involvement. These outcomes and activities have been reiterated throughout the literature involving capstone courses (Zimmerman, 1991; Wagenaar, 1993; Aupperle & Sarhan, 1995; Crunkilton et al., 1997; Zimmerman, 1997).

Many similarities are evident between what Wagenaar (1993) and Crunkilton et al. (1997) have described as essential components of capstone courses. Because of the nature of capstone courses and their roles within colleges and departments careful adherence to these principles must be maintained (AAC, 1985). While none of these authors referred to experiential learning by name, the theoretical framework is evident within the capstone requirements.

Conceptually, the main deficit encountered in the research on capstone courses is the direct inclusion of experiential learning activities into the curricula.

While many activities mentioned could be considered experiential in nature, the experiential learning models mentioned earlier are never included nor are they treated as essential components in the make up of the capstone courses. It is the discovery of this deficiency which makes this study of unique importance to the discipline.

AgEdS 450

The idea of a student managed farm began with Dr. William G. Murray in 1933. Dr. Murray's plan was to organize a teaching farm so that "before graduation a student expecting to operate a farm (would) have training in the farm practices of this area; the scientific principles of crops and animal production, including the use of power and equipment, the business principles of farming; and finally the making of management decisions" (Murray, 1945, p. 186). With Dr. Murray's leadership, a course called Ag450 was started in 1943 and focused heavily on agriculture production management.

In 1942 a 187 acre farm, located three miles south of Iowa State University, was purchased for $150.00 per acre. A house, barn, corn cribs, and other out-buildings were included in this acreage. Crops on the original Ag450 Farm were oats, corn, soybeans, hay, and pasture. A variety of animal enterprises have had a place on this farm such as poultry, dairy cattle, mules, draft horses, swine, beef cattle, and sheep (Honeyman, 1983).

Currently the Ag450 Farm focuses primarily on the swine enterprise, having just recently completed construction of a 1200 head confinement finisher and utilizing a modern nursery building and remodeled farrowing house. Crops grown consist of corn and soybeans on nearly 1000 acres of owned and leased land (Trede, 1997).

Today, as in 1943, the students in the AgEdS 450 course take a very hands-on approach to the management of the Ag450 Farm. Concerning the management of the farm, Dr. Larry Trede, Professor-in-Charge of the Ag450 Farm, stated:

> the management process includes making all the production and financial management decisions associated with a typical farm. Students gain experience in planning, purchasing, selling, and investing in farming enterprises. The Ag450 Farm operates largely as a self-supporting entity, with little financial help from the university. Since its inception in 1943, the farm has paid for all farm operating expenses, including farm labor, from the income generated from the sale of crops and livestock. Income has also been used to make several thousands of dollars of capital expenditures. (Trede, 1997, p. 1)

In serving as the Agricultural Education and Studies Department's capstone course, the AgEdS 450 course is required of Agricultural studies majors and offered as an elective for Agricultural Education majors as well as other agricultural majors in the university. This capstone course strives to provide its student with a multitude of opportunities to become proficient at management. There are five specific objectives which guide the instruction of the course and they are:

> 1) To provide an opportunity to participate in the actual management of a typical Iowa farm. Students must be aware of the farm's resources including the sustainability of those resources and the environmental and governmental regulation that affect those resources. 2) To provide students the opportunity to personally experience the challenges and satisfaction of an actual farm operation. 3) To develop and provide student participation in an effective committee structure. 4) To develop and promote the decision-making process. 5) To develop and promote group communication and relations. (Trede, course syllabus, Fall semester, 1997)

As the Department's capstone course in Agricultural Studies, the AgEdS 450 course provides the requisite learning activities mentioned in the 1997 Crunkilton study, namely teamwork, problem solving, decision-making, critical thinking, and communication. Similarly, past participants of ISU's Ag450 course have stated that the content of the class was both appropriate and useful in their careers (Soomro, 1991). Honeyman (1983) concludes with the statement "in the array of educational opportunities for agricultural students at Iowa State University, the Ag450 class has offered an unduplicated experience. In the Ag450 situation, learning has been remarkably practical...and applied in nature."

CHAPTER III. METHODS

The purpose of this study was to assess the value of experiential learning as it relates to capstone courses and to determine the perceptions of course completers as to the relevancy of these learning activities to their agricultural careers. Specific research objectives of this study were:

1. Describe the characteristics of capstone course completers.
2. Identify perceptions of program completers regarding selected educational concepts used in the capstone course.
3. Determine the quality of selected learning activities and instructional techniques by capstone course completers.
4. Identify strengths and weaknesses of a capstone course as an experiential learning resource.
5. Develop a model of experiential learning in capstone courses.

This chapter will detail the methods utilized to describe the research design, population, sampling procedures, development of the survey instrument, and analysis of data. Assumptions and limitations to the study will also be discussed.

Research Design

This study used a descriptive survey design. This type of research is grounded in the need to "describe and interpret what is." Further, descriptive survey research attempts to "measure what exists without questioning why it exists" (Ary, Jacobs, & Razavieh, 1985, p. 337). Descriptive survey research's advantages are that it can provide a plethora of information from a wide variety of individuals. These data can then be utilized to produce information about various aspects of education (Borg & Gall, 1989), which, in turn, leads to the improvement of education and educational delivery systems.

Population and Sampling Procedures

The population for this study consisted of the 335 course completers (265 Agricultural Studies majors, 42 Agricultural Education majors, and 28 other majors) of the Agricultural Education and Studies Department's capstone course, AgEdS 450, which were enrolled between Fall semester 1991 and Summer semester 1996, graduated from ISU, and currently have addresses on file with the ISU Alumni Foundation at Iowa State University. This time frame was selected because no known research data had been gathered on these course completers. Based upon the unequal population size among the three targeted groups of course completers, independent random samples were generated for all three groups following the model set up by Krejcie and Morgan (1970). A total random sample of 214 course completers was utilized, with 150 registered as Agriculture Studies majors, 38 as Agricultural Education majors, and 26 as other majors.

Instrumentation

Based upon the objectives of this study, a questionnaire was developed by the investigator. Instrument items were selected from related studies and content determined by utilizing the researcher's background, a review of related studies (Soomro, 1991; Stevenson, 1985; Hamilton, 1979), input from faculty and staff familiar with the capstone course, and the researcher's graduate committee.

The questionnaire was pilot tested utilizing the Fall 1997 AgEdS 450 class to ensure face validity and to test the reliability of the instrument. Reliability coefficients were calculated resulting in scores of .93 for Part I, .79 for Part II, and .85 for Part III.

The questionnaire consisted of four parts. Part I identified the benefits of the course to the first agricultural position of the completers. The questions were developed from a review of relevant literature and from consultations with course instructors. A five point Likert-type scale was used which ranged from 1 signifying

"strongly disagree", 2 signifying "disagree", 3 signifying "undecided", 4 signifying "agree", to 5 signifying "strongly agree."

Part II of the questionnaire contained ten comparison questions asking the respondents to compare selected experiential learning activities from the capstone course with other courses taken. Respondents selected one choice of either "less than," "equal to," or "more than" as it related to the comparison being made between the capstone course and its experiential learning activities and the other junior and senior level courses they had taken.

Part III consisted of fifteen questions concerning the value and quality of selected learning activities and instructional techniques as they related to the quality of the learning activities within the capstone course. A five point Likert-type scale was used where 1 indicated "poor," 2 indicated "below average," 3 indicated "average," 4 indicated "above average," and 5 indicated "excellent."

Demographic data were gathered in Part IV to better understand the research findings, to develop a profile of the respondents, and to make comparisons among different responding groups. Selected question included: first agricultural job after completion of AgEdS 450, current position, if the student had a farm background prior to taking the course, did they hold a leadership position within the class, what was their class committee affiliation, and other demographic questions such as gender, major, and graduation date.

Data Collection

The Iowa State University Committee on the use of Human Subjects in Research reviewed and approved the cover letter, questionnaire and research procedures and objectives (Appendix A).

The cover letter, questionnaire and a self-addressed stamped envelope were mailed to the sample selected from the target population in November, 1997. A sample copy of the cover letter and questionnaire are referenced in Appendix B. The Dillman Total Design Method (Dillman, 1978) was followed in the subsequent

mailings of postcard reminders, follow-up letters, and questionnaires. A postcard was mailed approximately two weeks after the initial mailing. A second questionnaire was mailed just prior to the holidays in December. Because of the holiday season, an expanded period of time was allowed for responses (until mid January). A total of 134 usable instruments were returned for a response rate of 62.6%.

A random survey of non-respondents indicated no significant difference between early respondents and non-respondents, early respondents and late respondents, and late respondents and non-respondents. Therefore, the results of this study may be generalized to the population from which the sample was drawn.

Analysis of Data

Questionnaires were coded for analysis purposes. Responses were entered into the Excel® spreadsheet program. Statistical analysis was conducted using the SPSS® statistical package. Data were analyzed using frequencies, percentages, means, standard deviations, t-tests and analysis of variance (ANOVA).

Assumptions of the Study

Experiential learning and capstone courses are important education activities. As such the following assumptions were made in and during the course of this study:

1. The data collected were truthful responses of the respondents.
2. Findings would result which would enable the researcher to develop model for the incorporation of experiential learning into a College of Agriculture capstone course.
3. Significant factors affecting the problem were not overlooked.
4. Respondents possessed opinions concerning experiential learning and the capstone course, AgEdS 450.

Limitations of the Study

The following items were considered to be limitations of this study:

1. The population of this study was limited to course completers of the AgEdS 450 course at Iowa State University, Department of Agricultural Education and Studies from 1991–1996 and, therefore, cannot be generalized to other groups.
2. Results were obtained from a set of responses to a structured questionnaire.

CHAPTER IV. FINDINGS

In this chapter an analysis of the data and findings are presented. The results address the specific objectives presented earlier in this study; namely, to determine the perceptions of course completers of a college of agriculture capstone course regarding the perceived benefits and quality of selected experiential learning activities and instructional techniques and their applicability towards their first post graduation career choice. Specific objectives included:

1. Describe the characteristics of capstone course completers.
2. Identify perceptions of program completers regarding selected educational concepts used in the capstone course.
3. Determine the quality of selected learning activities and instructional techniques by capstone course completers.
4. Identify strengths and weaknesses of a capstone course as experiential learning resources.
5. Develop a model for experiential learning in capstone courses.

This chapter will present the data collected and the findings of the statistical analyses of this study. Specific sections will include: (a) characteristics of the sample (AgEdS 450 course completers), (b) benefits of the capstone course, AgEdS 450, in post graduation career preparation, (c) a comparison of the capstone course, AgEdS 450, to other junior and senior level agricultural courses, (d) the quality of the learning activities and instructional techniques of the capstone course, AgEdS 450, (e) synthesis of written comments, and (f) a summary.

Characteristics of the Sample

Questionnaire respondents were asked to provide answers to fill in the blank questions or to select the most appropriate answer from a list of choices. Selected demographic characteristics of the sample are presented in Table 1.

The preponderance of students enrolling in the capstone course, AgEdS 450, were male (85%), had a farm background (94.1%), and enrolled in AgEdS 450 one time (84.4%). Females accounted for less than 15% of the sample.

Five undergraduate curricula were represented in the sample. As noted, Agricultural Studies was the largest with 90 respondents (71.4%). Agricultural Education accounted for an additional 16.7% of the course enrollees, followed by Agricultural Business (9.5%). Animal Science and Agronomy majors accounted for less than 2% of the total sample.

Working in a farming operation (farm management: family or non-family) was the first professional position of nearly 40% of the sample. Industry jobs relating to agricultural sales and service accounted for an additional 25%. Seventeen percent of the respondents indicated "*other*" as their first professional position. These positions included such jobs as: researcher, loan officer, military service, entrepreneur, graduate school, and non-agricultural business. Agribusiness management and teaching accounted for less than 15%.

Students may enroll in AgEdS 450 during the spring, fall, or summer semesters. The majority of the respondents indicated that they enrolled during the fall (45.7%) and spring (41.4%) semesters. Slightly more than 10% of the respondents enrolled in the summer class. Students have the opportunity to enroll in the capstone course more than one time; however, due to the demand for the class, few students have that opportunity. As indicated in Table 1, nearly 85% of the respondents enrolled only once.

Class procedures include group assignments and activities related to their farm committee assignment. Committees are identified for the major enterprises or activities related to the operation and management of the Ag450 farm. For the

Table 1. Frequency and percentage distribution for selected demographic characteristics of former participants in the AgEdS 450 course

Item	Frequency	Percent
Gender		
Male	115	85.2
Female	19	14.1
Undergraduate major		
Agricultural Studies	90	71.4
Agricultural Education	21	16.7
Agricultural Business	12	9.5
Animal Science	1	0.8
Agronomy	1	0.8
First professional position after graduation		
Farm management - Family	46	34.8
Sales/service	33	25.0
Agribusiness Management	13	9.8
Farm management - Non family	7	5.3
Teaching	6	4.5
Other	23	17.4
Semester enrolled		
Fall	53	45.7
Spring	48	41.4
Summer	13	11.2
Number of times enrolled in AgEdS 450		
One	114	84.4
Two	20	14.8
Three	1	0.7
Farm background		
Yes	127	94.1
No	7	5.2
Farm committee assignment		
Livestock	41	34.7
Crops	33	28.0
Machinery, buildings, grounds	24	20.3
Finance, marketing	20	16.9
Term and year of graduation		
Spring 1992	2	1.5
Fall 1992	2	1.5
Spring 1993	14	10.4

Table 1. Continued

Item	Frequency	Percent
Summer 1993	5	3.7
Fall 1993	3	2.2
Spring 1994	28	20.7
Summer 1994	3	2.2
Fall 1994	10	7.4
Spring 1995	17	12.6
Summer 1995	2	1.5
Fall 1995	10	7.4
Spring 1996	29	21.5
Fall 1996	7	5.2
Spring 1997	2	1.5
Summer 1997	1	.7

years covered by the sample, those committees included livestock, crops, machinery, buildings and grounds, finance, and marketing. For the majority of semesters, at least seven committees are appointed. The number of students on each committee will vary with the livestock, crops, machinery, and buildings and grounds committees having the largest number. Table 1 shows that the largest number of respondents were on the livestock committees (34.7%), followed by crops (28.0%). The finance and marketing committees were represented by slightly less than 17% of the sample.

Table 1 gives a breakdown of the frequency and percentage distribution of the respondents by the term and year of graduation from Iowa State University. There was a fairly equal distribution by term and year of graduation with the exception of 1992 and 1997. These years accounted for less than 5% of the responses. No responses were received from former participants in the Summer, 1992 and Summer, 1996. Responses were received from 67 former participants from the Spring of 1992 through the Fall 1994 and 68 graduates from Spring, 1995 through Summer, 1997.

Perceptions of a Capstone Course

One of the major objectives of this study was to determine the perceptions of course completers regarding the benefits of selected educational concepts utilized in the capstone course. Section 1 of the questionnaire asked respondents to indicate their level of agreement or disagreement with statements reflecting the beneficial aspects of the capstone course, AgEdS 450.

Seven factors were identified within Part 1. They were: experiential learning activities (questions 5, 9, 10, 11, 12, 14, 19, 25), managerial activities (questions 1, 2, 3, 4, 6, 7, 8, 18, 20, 22, 23, 24), livestock management (questions 26, 27, 28), crop management (questions 29, 30, 31), facility/equipment management (questions 32, 33, 34, 35), financial management (questions 36, 37, 38, 39, 40), and course activities (questions 13, 15, 16, 17, 21). The following 5-point Likert-

type scale was utilized (1=strongly disagree, 2=disagree, 3=undecided, 4=agree, and 5=strongly agree).

Table 2 shows the means and standard deviations related to the experiential learning activities of the capstone course. Scores ranged from 3.69 to 4.81. Respondents perceived these activities to be the most beneficial of all the factors identified in Part 1 with a grand mean score of 4.16. Team building activities, such as working as team members to solve problems and group decision-making skills rated the highest as beneficial experiential activities. Course completers also felt that the opportunity to exchange ideas and being responsible for their own learning were beneficial experiential learning activities.

Respondents perceived those competencies learned in livestock management to be the second most beneficial part of the course when compared with the other components in Part 1. Livestock management activities included

Table 2. Means and standard deviations of perceived benefits of relating to experiential activities in the capstone course in preparation for first professional position[a]

Experiential activity	Mean	SD
Work as a team to solve problems	4.81	.39
Group decision-making skills	4.47	.58
Opportunity to exchange ideas	4.25	.54
Responsible for own learning	4.17	.65
Class committees	4.13	.73
Development of human relation skills	4.09	.62
Develop alternatives to solve problems	4.02	.69
Delegate responsibility	3.69	.92
Grand mean	4.16	.41

[a]1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

care nutrition, health, breeding, and marketing practices. Scores ranged from 4.07 to 4.18 and the grand mean was 4.11 (Table 3).

The mean scores and standard deviation related to the perceived benefits of facility and equipment management activities (Table 4) ranged from 3.81 to 4.50. As individual items, building repair and maintenance was rated the most beneficial and equipment selection the least beneficial. The grand mean for this factor was 3.98.

Table 3. Means and standard deviations of perceived benefits of livestock management activities in the capstone course, AgEdS 450 in preparation for first professional position[a]

Livestock activity	Mean	SD
Livestock care	4.18	.57
Livestock marketing	4.09	.65
Livestock breeding	4.07	.67
Grand mean	4.11	.52

[a]1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

Table 4. Means and standard deviations for perceived benefits of the capstone course, AgEdS 450 relating to facility and equipment management activities in preparation for first professional position[a]

Facility/equipment management	Mean	SD
Building repair and maintenance	4.50	.50
Building planning, design, and construction	4.04	.69
Repair, maintenance, and operation	3.93	.83
Equipment selection	3.81	.85
Grand mean	3.98	.57

[a]1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

The mean scores related to crop management are shown in Table 5. Crop management activities included such management practices as variety selection, herbicide and pesticide programs, crop rotations, fertility management, tillage practices, crop marketing, and soil and water conservation and management. Respondents perceived the capstone course as providing a beneficial educational experience in crop management as it related to their first professional position. The area of soil conservation and water management was rated the lowest. The scores ranged from 3.94 to 4.17. The grand mean was 3.95.

Table 5. Means and standard deviations for perceived benefits of the capstone course, AgEdS 450, relating to crop management activities in preparation for first professional position[a]

Crop activity	Mean	SD
Crop management	4.17	.61
Crop marketing	4.04	.70
Soil conservation and water management	3.94	.59
Grand mean	3.95	.61

[a]1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

The perceived benefits of managerial activities in the capstone course are shown in Table 6. The scores ranged from 3.16 to 4.24. Many of the factors identified as managerial activities dealt with the overall management of the Ag450 farm. The highest rated activities were solving production agriculture problems, identifying and solving management problems, and making farm management decisions. All of these activities rated 4.0 or higher. The lowest rated item was aiding in formulating an agricultural philosophy (3.16) followed by health and safety

Table 6. Means and standard deviations of perceived benefits of the capstone course, AgEdS 450 relating to managerial procedures in preparation for first professional position[a]

Managerial activity	Mean	SD
Solve production agriculture problems	4.24	.62
Identify and solve management problems	4.20	.66
Make farm management decisions	4.15	.71
Analysis of farm records	4.01	.79
Evaluate new technology	3.99	.76
Work with agribusinesses	3.95	.83
Consideration of environmental factors	3.88	.86
Sustainability of farm resources	3.80	.84
Study new agricultural practices	3.76	.81
Health and safety issues of farm employees	3.59	.87
Formulating agricultural philosophy	3.16	.99
Grand mean	3.90	.49

[a]1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

issues of farm employees (3.59). The grand mean for all managerial activities was 3.90.

Table 7 shows the means and standard deviations related to course activities within the capstone course. Respondents perceived the application of knowledge learned from other courses into the capstone course, to be the most beneficial (4.22) and encouraging students to seek information from ISU extension staff (3.59) and using a variety of assessment procedures (3.60) as the least beneficial. The grand mean for all course activities was 3.87.

Table 8 gives the mean scores and standard deviations of the financial management area. Financial management includes a variety of activities such as keeping and analyzing farm records, developing budgets, managing cash flow, business planning, managing farm employees, and leasing/purchasing land.

Table 7. Means and standard deviations of perceived benefits of the capstone course, AgEdS 450 relating to course activities in preparation for first professional position[a]

Course activity	Mean	SD
Apply knowledge gained from other courses	4.22	.68
Preparing and presenting reports	4.02	.70
Developing respect for different ideas	3.91	.69
Variety of assessment procedures	3.60	.77
Seek information from ISU extension	3.59	.92
Grand mean	3.87	.47

[a]1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

Scores ranged from 3.49 to 4.53. Keeping and analyzing farm records (4.53) rated the highest as a financial management activity followed by budgeting and planning (4.01) and financial management (4.01). Leasing/purchasing land (3.46) and employee management (3.50) were the lowest rated factors in this category.

Table 8. Means and standard deviations for perceived benefits of managerial activities in the capstone course, AgEdS 450 in preparation for first professional position[a]

Record keeping activity	Mean	SD
Keeping and analyzing farm records	4.53	.70
Budgeting and planning	4.01	.76
Financial management	4.01	.80
Employee management	3.50	.99
Leasing/purchasing land	3.49	.84
Grand mean	3.83	.64

[a]1=strongly disagree, 2=disagree, 3=undecided, 4=agree, 5=strongly agree.

Comparison of the Capstone Course, AgEdS 450, to Other Junior and Senior Level Agricultural Courses at Iowa State University

The second objective of this study was to identify the perceptions of course completers regarding selected educational concepts utilized in the capstone course, AgEdS 450. Within this objective was the need to compare selected opportunities and interactions presented to students enrolled in the capstone course to similar junior and senior level agricultural courses that they had taken at Iowa State University. Table 9 provides information regarding these comparisons. Respondents were asked to indicate whether AgEdS 450 had "fewer or less than," "equal to," or "more or greater than" opportunities and/or interactions than other junior or senior level agricultural courses for the identified variables.

Respondents indicated that AgEdS 450 provided more "hand-on activities" (92.6%), "student-student interactions" (88.9%), "learning through experiences" (88.1%), and "student directed learning" (81.3%) than other junior and senior level agricultural courses. This would be consistent with the stated course objectives previously described in this study and is also consistent with many of the class activities implemented as part of the course curriculum. The lowest rated variable was "material previously learned in other courses." Only 45.2% of the respondents felt that AgEdS 450 provided more opportunities to use previously learned material than in other junior or senior level courses. For all the variables identified (10 in total), there was almost universal agreement that other courses provided "fewer" opportunities and interactions than AgEdS 450.

Quality of Learning Activities and Instructional Techniques

Objective 3 of the study was to determine which instructional concepts were most beneficial to the students in their agricultural careers. Respondents were asked to rate the quality of selected learning activities and instructional techniques utilized in the capstone course, as found in Part III of the questionnaire.

Table 9. A comparison of the presence of selected variables AgEdS 450 and other junior and senior level courses

Variable	Factors in the capstone course: Less than other courses f	%	Equal to other courses f	%	Greater than other courses f	%
Hands-on activities	0	(0.0)	10	(7.4)	125	(92.6)
Student-student interaction	0	(0.0)	15	(11.1)	120	(88.9)
Learning through experiences	0	(0.0)	16	(11.9)	119	(88.1)
Student directed learning	0	(0.0)	25	(18.7)	109	(81.3)
Opportunities to plan activities	1	(0.7)	31	(23.1)	102	(76.1)
Put course objectives into practice	5	(3.7)	28	(20.7)	102	(75.6)
Problem solving/ decision-making	5	(3.7)	51	(37.8)	79	(58.5)
Teacher-student interaction	16	(11.9)	44	(32.6)	75	(55.6)
Material previously learned in other classes	17	(12.6)	57	(42.2)	61	(45.2)
Goal setting	6	(4.4)	50	(37.0)	79	(58.5)

The quality of the learning activities and instructional techniques was rated by the respondents using the scale 1=poor, 2=below average, 3=average, 4=above average, or 5=excellent. Questions 1, 4, 6, 8, 9, 14, and 15 were categorized as learning activities while questions 2, 3, 5, 7, 10, 11, 12, and 13 were categorized as the instructional techniques. The categories were determined by the course instructors. The means and standard deviations are reported in Tables 10 and 11.

For this discussion, learning activities were defined as course components requiring a hands-on approach. Instructional techniques comprised pedagogical methods utilized in the presentation of course materials and for the achievement of course objectives.

Table 10. Means and standard deviations for quality of the capstone course, AgEdS 450 relating to learning activities[a]

Learning activity	Mean	SD
Participating in the management of the farm	4.10	.77
Working with farm staff to solve problems	4.07	.78
Electing class officers	3.89	.89
Having a work experience on the farm	3.89	.97
Analyzing a strategic issue	3.72	.77
Contacting and interacting with vendors	3.68	.89
Using ISU faculty and staff as speakers	3.42	.84
Grand mean	3.82	.84

[a]1=poor, 2=below average, 3=average, 4=above average, 5=excellent.

Table 11. Means and standard deviations for quality of the capstone course, AgEdS 450 relating to instructional techniques[a]

Instructional techniques	Mean	SD
Using a real farm as a laboratory	4.40	.74
Interacting with fellow students	4.25	.69
Utilizing classroom and laboratory activities	4.13	.79
Using committees in decision-making	4.10	.78
Preparing and presenting oral reports	3.77	.82
Having outside speakers present information	3.62	.94
Developing written reports	3.41	.85
Utilizing computer technology to collect data	3.14	1.04
Grand mean	3.85	.83

[a]1=poor, 2=below average, 3=average, 4=above average, 5=excellent.

For learning activities (Table 10), "participating in the management of the farm" rated the highest. This item was closely followed by "working with farm staff to solve problems." These activities rated 4.10 and 4.07, respectively. The activities, "electing class officers" and "having a work experience on the farm" were both rated 3.89, indicating an above average quality. As a learning activity, "using ISU faculty and staff as speakers" was rated the lowest (3.42). The grand mean was 3.82.

Having a "real farm as a laboratory" and "interacting with fellow students" rated the highest as instructional techniques (Table 11) with ratings of 4.40 and 4.25, respectively. The instructional technique, "utilizing computer technology to collect data," rated the lowest (3.14). With nearly identical scores of 4.13 and 4.10, "utilizing classroom and laboratory activities" and "using class committees in decision-making" were rated as above average by respondents. The grand mean of 3.85 indicates that the instructional techniques employed in the capstone course were "above average."

Analysis of Perceived Benefits of the Capstone Course by Demographic Variables

The analyses associated with this study will focus on the variables in Part 1 of the questionnaire. While the capstone course, which served as the population frame for this study, deals with content relating to farm management and operation, it contains the required components as outlined by Crunkilton et al. (1997). These required components have been summarized in this study as the variables *experiential learning* and *course activities*. Analysis of variance tests and the Scheffe post hoc analysis were run to identify significant differences between the selected variables. An alpha level of 0.05 was used throughout all analyses.

When compared by gender, there were no significant differences in the perceived benefits of AgEdS 450 regarding the variables experiential learning and course activities(Table 12). Likewise, for the course specific variables, no

significant differences were found. The category of financial management was ranked the lowest by both males and females (3.81 and 3.86, respectively). Females rated all categories higher than males, with the exception of equipment and facility management. However, respondents generally agreed that all categories were of benefit to them in their first professional position regardless of gender.

Table 12. Test of significance of perceived benefits of the capstone course program areas by gender

	Gender					
	Male	Female				
	M	M				
	SD	SD	df	MS		
Category	(n=114)	(n=19)	within	within	F-ratio	F-prob.
Experiential learning	4.15[a]	4.24	2	.117	1.163	.283
	.40	.49	130	.171		
Course procedures	3.85	3.97	2	.115	.947	.332
	.45	.57	131	.223		
Managerial activities	3.90	3.93	2	.006	.273	.762
	.47	.63	130	.246		
Livestock management	4.10[b]	4.23	2	.437	1.632	.200
	.54	.37	132	.268		
Crop management	3.92	4.16	2	.553	1.473	.233
	.61	.65	131	.375		
Equipment/facility management	3.98[b]	3.93	2	.006	.172	.842
	.53	.80	132	.328		
Financial management	3.81	3.86	2	.323	.793	.454
	.63	.67	131	.408		

[a]n equals 113.
[b]n equals 115.

Table 13 reveals that both students with and without farm backgrounds prior to enrolling in the capstone course perceived the experiential learning activities and course activities to be of benefit to them in their first professional position after graduation. Students with no prior farm background rated the benefits of the experiential learning activities and course activities slightly higher (4.27) than did the students with farm backgrounds (4.15), however no categorical difference was noted. With the exception of livestock management activities, non-farm students tended to rate all other activities slightly higher than students with farm backgrounds. Thus, it may be concluded that these activities were of equal benefit to students from either background and no curricular adaptions need to be made in the course to accommodate these differences.

The analysis of variance (Table 14) for perceived benefits of experiential learning activities and course activities indicated a significant statistical difference between groupings by first professional position after graduation. Those who indicated teaching as their first professional position rated both the experiential learning activities and course activities significantly higher ($p<0.05$) than did those respondents indicating farming or other professional areas of employment. Likewise, they tended to rate the other categories higher than students in the other two employment areas.

Regardless of the semester of enrollment in the capstone course, respondents enrolled in all semesters reported equal benefit. Table 15 shows that there are no significant differences in the perceived benefits of the capstone course by semester of enrollment. All groups agreed that the course was beneficial to their first professional position. These results suggest that AgEdS 450 is equally beneficial for each semester.

An analysis of variance (Table 16) indicated significant statistical differences in the perceived benefits of the experiential learning and the equipment/facility management variables with regards to the term and year of graduation. Regarding

Table 13. Test of significance for perceived benefits of the capstone course program areas by farm background

Category	Background: Farm M SD (n=126)	Background: Non-farm M SD (n=7)	df within	MS within	F-ratio	F-prob.
Experiential learning	4.15[a] .42	4.27 .35	2 130	.005 .173	.287	.751
Course procedures	3.86 .47	3.94 .50	2 131	.002 .224	.103	.902
Managerial activities	3.89[a] .50	4.21 .24	2 130	.375 .242	1.476	.232
Livestock management	4.12[b] .53	4.00 .38	2 132	.005 .274	.200	.819
Crop management	3.94 .42	4.09 .63	2 131	.008 .382	.200	.819
Equipment/facility management	3.97[b] .53	4.11 .13	2 132	.009 .328	.263	.769
Financial management	3.82 .65	3.94 .46	2 131	.007 .411	.164	.849

[a]n equals 125.
[b]n equals 127.

Table 14. Test of significance for perceived benefits of the capstone course program areas by first professional position

Category	Employment area: Farming M SD (n=53)	Teaching M SD (n=6)	Other M SD (n=68)	df within	MS within	F-ratio	F-prob.
Experiential learning	4.10[a] .42	4.65[a] .40	4.20[a,b] .37	2 123	.810 .157	5.148	.007
Course procedures	3.82[a] .45	4.43[a] .39	3.86[a] .46	2 124	1.020 .204	5.001	.008
Managerial activities	3.88 .47	4.35 .49	3.89[b] .51	2 123	.607 .244	2.486	.087
Livestock management	4.09[c] .54	4.44 .46	4.12 .52	2 125	.335 .277	1.207	.303
Crop management	3.92[c] .54	4.39 .65	3.97 .65	2 125	.594 .369	1.611	.204
Equipment/facility management	3.98[c] .56	4.29 .84	3.98 .51	2 125	.279 .298	.936	.395
Financial management	3.79[c] .57	4.07 .60	3.83[b] .69	2 124	.204 .412	.494	.611

[a]Means significantly different.
[b]n equals 68.
[c]n equals 54.

Table 15. Test of significance for perceived benefits of the capstone course program areas by semester of enrollment

Category	Semester: Fall M SD (n=53)	Spring M SD (n=48)	Summer M SD (n=13)	df within	MS within	F-ratio	F-prob.
Experiential learning	4.17 .45	4.14[b] .40	4.19 .44	3 111	.003 .184	.067	.977
Course procedures	3.12[a] .50	3.88 .46	4.02 .57	3 111	.149 .240	.621	.603
Managerial activities	3.88[a] .44	3.95[b] .50	3.89[c] .64	3 110	.004 .244	.156	.926
Livestock management	4.04 .47	4.17 .61	4.03 .35	3 112	.155 .273	.567	.638
Crop management	3.86 .74	4.08 .55	3.90 .37	3 112	.433 .393	1.101	.352
Equipment/facility management	3.92 .56	4.03 .60	3.98 .55	3 112	.252 .334	.754	.522
Financial management	3.79[c] .57	4.07 .60	3.83[b] .69	2 111	.372 .387	.961	.414

[a]n equals 52.
[b]n equals 47.
[c]n equals 12.

Table 16. Test of significance for perceived benefits of the capstone course program areas by term and year of graduation

Category	Term and year of graduation 1[a] M SD (n=26)	2[b] M SD (n=70)	3[c] M SD (n=39)	df within	MS within	F-ratio	F-prob.
Experiential learning	3.97[d,e,f] .27	4.19[d] .43	4.22[e] .43	2 130	.507 .165	3.064	.050
Course procedures	3.75 .33	3.83[g] .50	4.00 .48	2 131	.547 .216	2.529	.084
Managerial activities	3.75 .50	3.91[g] .51	4.00[h] .45	2 130	.500 .240	2.084	.129
Livestock management	4.10 .52	4.07 .55	4.21 .46	2 132	.242 .271	.893	.412
Crop management	3.88 .56	3.90 .69	4.11[h] .48	2 131	.618 .374	1.652	.196
Equipment/facility management	3.88 .52	3.90[d] .60	4.19[d] .50	2 132	1.189 .311	3.823	.024
Financial management	3.73 .62	3.80[g] .69	3.93 .54	2 131	.366 .407	.899	.409

[a]Spring semester 1992 - Fall semester 1993.
[b]Spring semester 1994 - Fall semester 1995.
[c]Spring semester 1996 - Summer semester 1997.
[d]Means are significantly different.
[e]Means are significantly different.
[f]n equals 24.
[g]n equals 69.
[h]n equals 38.

experiential learning, group 1 (Spring semester 1992 - Fall semester 1993) rated the activities significantly different than either group 2 (Spring semester 1994 - Fall semester 1995) or 3 (Spring semester 1996 - Fall semester 1997). There were no significant statistical differences between groups 2 and 3.

The analysis of variance for the variable equipment/facility management indicated a significant statistical difference between groups 2 and 3. This difference is likely due to the increased amount of capital improvements made on the Ag450 farm in recent years as well as the newer line of equipment used in the farming practices. It is interesting to note that the mean scores for all categories generally increased for those students who graduated most recently as compared to earlier graduates.

No distinctions regarding the perceived benefits of the experiential learning activities and course activities were noted between committees (Table 17). All course participants are assigned to a class committee based on their individual interests and are responsible for their respective managerial area of the Ag450 farm. Members of all class committees agreed that the selected variables were beneficial in preparing them for their first professional position.

Results of the analysis of variance (Table 18) on the effect of major on the perceived benefits of selected course activities revealed a significant difference ($p<0.05$). Agricultural Education majors rated the experiential learning activities significantly higher than students majoring in Agricultural Studies. Likewise, Agricultural Education majors rated all other categories, including course procedures, slightly higher than Agricultural Studies majors or other majors. There were no significant differences found between Agricultural Education majors and other majors.

Analysis of Learning Activities and Instructional Techniques by Demographic Variables

Objective three of this study seeks to determine the perceived quality of selected learning activities and instructional techniques by capstone course

Table 17. Test of significance for perceived benefits of the capstone course, AgEdS 450 program areas by committee assignment

Category	Committee assignment 1[a] M SD (n=41)	2[b] M SD (n=24)	3[c] M SD (n=33)	4[d] M SD (n=20)	df within	MS within	F-ratio	F-prob.
Experiential learning	4.20[e] .40	4.32[f] .45	4.08 .40	4.16 .48	3 112	.280 .179	1.563	.202
Course procedures	3.89 .50	3.96 .55	3.79 .38	3.93 .50	3 114	.147 .231	.637	.593
Managerial activities	3.90 .63	4.07 .43	3.85 .43	3.88 .46	3 113	.235 .263	.893	.447
Livestock	4.12 .67	4.18 .49	4.13 .41	4.15 .50	3 114	.002 .297	.064	.979
Crop management	4.02 .61	3.86 .77	3.89 .64	4.07 .50	3 114	.251 .408	.616	.606
Equipment/facility management	4.09 .62	4.03 .57	3.98 .51	3.95 .65	3 114	.248 .345	.718	.543
Financial management	3.80 .68	3.83 .70	3.89 .54	3.96 .53	3 113	.122 .391	.312	.817

[a]Livestock committees.
[b]Machinery and building / grounds committees.
[c]Crops committee.
[d]Finance and marketing committees.
[e]n equals 40.
[f]n equals 23.

Table 18. Test of significance for perceived benefits of the capstone course program areas by major

Category	Major: Ag Ed M SD (n=21)	Major: Ag St M SD (n=90)	Major: Other[a] M SD (n=14)	df within	MS within	F-ratio	F-prob.
Experiential learning	4.41[b] .50	4.09[b, c] .40	4.23 .30	2 120	.889 .169	5.257	.006
Course procedures	3.97 .64	3.85[d] .47	3.87 .35	2 121	.122 .224	.543	.582
Managerial activities	4.07 .50	3.87[d] .52	3.96 .29	2 121	.337 .250	1.350	.263
Livestock management	4.27 .52	4.11 .49	3.98 .55	2 122	.384 .252	1.525	.222
Crop management	4.22 .69	3.92 .54	3.98 .38	2 122	.785 .304	2.580	.080
Equipment/facility management	4.05 .79	3.94 .54	4.13 .34	2 122	.271 .328	.827	.440
Financial management	3.95[e] .68	3.84 .57	3.91 .60	2 121	.117 .352	.334	.717

[a]Other majors include ag business, animal science, agronomy.
[b]Means are significantly different.
[c]n equals 88.
[d]n equals 89.
[e]n equals 20.

completers. Part 3 of the questionnaire asked respondents to rate the quality of selected learning activities and instructional techniques.

Table 19 indicates that no significant differences were found in the mean scores for quality of learning activities and instructional techniques following Levene's test for equality of variances. However, the mean scores of females were higher than those of males.

Table 19. T-test for independent means of learning activities and instructional techniques by gender

	Gender			
	Male	Female		
	M	M		
	SD	SD		
Category	(n=112)	(n=19)	t-value	t-prob.
Learning activities	3.82	3.89[a]	-.485	.629
	.57	.63		
Instructional techniques	4.16	4.26	-1.059	.291
	.40	.49		

[a]n equals 18.

Table 20 shows that respondents with no previous farm background rated the quality of learning activities and instructional techniques higher than respondents with a farm background. There were, however, no significant statistical differences between the means with Levene's test for equality of variances.

Analysis of the quality of learning activities and instructional techniques by employment area are summarized in Table 21. No significant statistical difference was indicated between the three groups concerning learning activities. Teachers, however, rated these activities higher than the other two groups. There was a

Table 20. T-test for independent means of learning activities and instructional techniques by farm background

Category	Background: Farm M SD (n=124)	Background: Non-farm M SD (n=7)	t-ratio	t-prob.
Learning activities	3.82[a] .57	3.91 .56	.452	.652
Instructional techniques	4.16 .42	4.30 .26	.162	.366

[a]n equals 123.

Table 21. Test of significance for learning activities and instructional techniques by first professional position

Category	Employment area: Farming M SD (n=51)	Teaching M SD (n=6)	Other M SD (n=68)	df within	MS within	F-ratio	F-prob.
Learning activities	3.74[a] .65	4.24 .31	3.90[b] .50	2 121	.848 .315	2.691	.072
Instructional techniques	4.11[c] .43	4.56[c] .42	4.20 .37	2 122	.570 .155	3.681	.028

[a]n equals 52.
[b]n equals 66.
[c]Means differ significantly.

significant difference in the quality ratings of instructional techniques between farming and teaching. Teachers rated the quality of the instructional techniques 4.56 and farmers 4.11. Overall, all groups were pleased with the quality of both the learning activities and instructional techniques of the capstone course rating them overall above average.

Respondents from summer semesters rated the learning activities and instructional techniques the lowest of the three groups (Table 22). Spring semester students rated learning activities higher than did either summer or fall students while fall students rated the instructional techniques higher than either summer of spring students. An analysis of variance test indicated no significant difference.

Table 22. Test of significance for learning activities and instructional techniques by semester of enrollment

	Semester						
	Fall	Spring	Summer				
	M	M	M				
	SD	SD	SD	df	MS		
Category	(n=53)	(n=47)	(n=13)	within	within	F-ratio	F-prob.
Learning activities	3.78[a]	3.85	3.65	3	.164	.488	.691
	.62	.48	.72	109	.336		
Instructional techniques	4.20	4.16[b]	4.06	3	.007	.422	.738
	.41	.42	.47	110	.180		

[a]n equals 51.
[b]n equals 46.

A significant difference was found in the quality of the learning activities and instructional techniques used in the capstone course, AgEdS 450, when grouped by term and year of graduation (Table 23). While all respondents rated these activities and techniques above average, the mean responses for group 3 (Spring

semester 1996-Fall semester 1997) were significantly higher in both learning activities and instructional techniques. It is interesting to note that mean scores for both categories were higher for more recent graduates compared to earlier graduates. It can be concluded that recent graduates of the capstone course, AgEdS 450, found the learning activities and instructional techniques of higher quality than did the earlier graduates.

Table 23. Test of significance for learning activities and instructional techniques by term and year of graduation

	Term and year of graduation						
	1[a]	2[b]	3[c]				
	M	M	M				
	SD	SD	SD	df	MS		
Variable	(n=25)	(n=67)	(n=39)	within	within	F-ratio	F-prob.
Learning activities	3.59[d]	3.85	3.96[d]	2	1.066	3.323	.039
	.63	.57	.52	128	.321		
Instructional techniques	4.00[e,f]	4.18[g]	4.26[e]	2	.501	3.054	.051
	.37	.43	.37	129	.164		

[a]Spring semester 1992 - Fall semester 1993.
[b]Spring semester 1994 - Fall semester 1995.
[c]Spring semester 1996 - Fall semester 1997.
[d]Means differ significantly.
[e]Means differ significantly.
[f]n equals 24.
[g]n equals 70.

Table 24 indicates that no significant difference was found in the quality of learning activities and instructional techniques between committee assignments in the capstone course. All respondents, regardless of committee assignment rated the overall quality as above average (1=poor, 2=below average, 3=average, 4=above average, 5=excellent).

Table 24. Test of significance for learning activities and instructional techniques by committee assignment

Variable	Committee assignment 1[a] M SD (n=39)	2[b] M SD (n=24)	3[c] M SD (n=33)	4[d] M SD (n=20)	df within	MS within	F-ratio	F-prob.
Learning activities	3.88 .56	3.96 .55	3.85[e] .65	3.81 .58	3 111	.009 .345	.256	.857
Instructional techniques	4.21 .43	4.30[f] .42	4.09 .41	4.18 .46	3 111	.217 .182	1.192	.316

[a]Livestock committees.
[b]Machinery and building / grounds committees.
[c]Crops committee.
[d]Finance and marketing committees.
[e]n equals 32.
[f]n equals 23.

The analysis of variance presented in Table 25 indicates a significant statistical difference in the rated quality of instructional techniques by major. Respondents majoring in agricultural education rated the overall quality of the instructional techniques in the capstone course significantly higher than respondents majoring in agricultural studies. Both groups are housed within the same department indicating that the differences in curriculum between the two majors may play a role in the perceived quality of instructional techniques in a capstone course in the College of Agriculture.

Table 25. Test of significance for learning activities and instructional techniques by major

Variable	Major: Ag Ed M SD (n=21)	Major: Ag St M SD (n=89)	Major: Other[a] M SD (n=14)	df within	MS within	F-ratio	F-prob.
Learning activities	3.93 .61	3.80 .59	3.93[b] .46	2 119	.199 .343	.581	.561
Instructional techniques	4.37[d] .50	4.10[c,d] .40	4.29 .28	2 119	.736 .167	4.401	.014

[a]Other majors include ag business, animal science, agronomy.
[b]n equals 12.
[c]n equals 87.
[d]Means are significantly different.

Synthesis of Written Comments

Thirty percent (n=69) of the respondents included written comments concerning their perception of the capstone course, AgEdS 450. These comments added to the findings of this study in a qualitative manner. While the majority of the comments were in praise of the course, many respondents offered suggestions on how either the course or the agricultural practices within the course could be improved.

A common thread expressed throughout the comments was an appreciation for the experiential learning aspects of the course. Respondents indicated that the capstone course was the most useful and beneficial course they had taken. Reasons given were hands-on experience, problem-solving nature of the student activities, usefulness of the decision-making process, and team work within and between class committees.

Several of the course procedures of the AgEdS 450 course were commented on. Respondents remarked about the high levels of participation and the opportunities to be involved. Suggestions were made to incorporate more record keeping and data analysis into course activities and to take responsibility for their actions and decisions.

Several respondents iterated the need to stay on the leading edge of technology, improve the record keeping system of the farm, diversify the livestock operation, and encourage students to take the course more than one semester so that the results of their decisions could be observed. (See Appendix D for specific written comments.)

Summary

This chapter presented the findings of this study in the order of the stated objectives. Characteristics of course completers was presented concerning gender, farm background, first professional position after graduation, the semester of enrollment in the capstone course, the term and year of graduation, farm committee assignment, major while enrolled in the capstone course, and analyses by descriptive information.

Data were reported on perceived benefits as they related to the capstone course completer's first professional position. The quality of learning activities and instructional techniques employed were reported, as well as comparisons generated between the capstone course, AgEdS 450, and other junior and senior level agriculture courses.

CHAPTER V. DISCUSSION

The stated purpose of this study was to assess the value of experiential learning as it relates to capstone courses. Further, this study sought to determine the perceptions of course completers regarding the benefits and the quality of selected learning activities and instructional techniques to their agricultural careers.

This study utilized a College of Agriculture capstone course as its population. This capstone course, AgEdS 450, is administered by the Department of Agricultural Education and Studies at Iowa State University. This course is the capstone course for the Agricultural Studies program and is required by the department to be completed by all graduates in their junior or senior year. Agricultural Education majors are encouraged to enroll in this course and enrollment is open to other majors at Iowa State as well.

Specific research objectives of this study were : (a) identify perceptions of program completers regarding selected educational concepts used in the capstone course, (b) determine which instructional concepts are most beneficial to students in their agricultural careers, (c) identify the strengths and weaknesses of a capstone course as an experiential learning resource, (d) describe the characteristics of capstone course completers, and (e) develop a model for incorporating experiential learning into capstone courses.

This study employed a descriptive survey design, which according to Ary et al., allows for the description and interpretation of what exists within a population (1985). The perceptions of program completers regarding a capstone course and the benefits of experiential learning within this course could be best facilitated through this design.

A discussion of the research findings in Chapter IV and a model for the articulation of experiential learning into a capstone course will be presented. The chapter is divided into sections which will cover the objectives guiding this study

and which will allow for further discussion. These chapter divisions are: (a) experiential learning in a capstone course, (b) learning activities and instructional techniques in capstone courses, (c) farm management activities, (d) a model for incorporating experiential learning into capstone courses, and (e) summary.

Experiential Learning Activities in a Capstone Course

The expected outcomes of a course are based, in part, upon the type or types of instructional methodologies employed in the course. Pedagogy in capstone courses is influenced by many of the same concerns experienced in other courses. One significant difference is the capstone courses' "summative" nature and the requirement that certain pedagogical characteristics be present. These characteristics include: teamwork, problem solving, decision-making, critical thinking, and communication (Crunkilton, 1997).

The role that experiential learning plays in this capstone effort is to provide a vehicle for summarizing the activities characterized in capstone courses. By design, capstone courses build upon knowledge previously gained in other courses (Zimmerman, 1991; Wagenaar, 1993; Aupperle & Sarhan, 1995; Crunkilton et al., 1997; Zimmerman, 1997). The experiential process provides for integration, synthesis, and evaluation of the activities and outcomes of the activities desired and deemed essential to a capstone course.

The activities of the capstone course, AgEdS 450, were all highly rated by questionnaire respondents. Scores ranged from 3.69 to 4.81 on the 5-point Likert type scale employed in this study. The experiential learning activity, "working in teams to solve problems," was indicated to be of highest benefit to course completers. Likewise, experiential activities of "group decision-making," "exchanging ideas," "self-directed learning," "class committee structure of the course," "developing human relation skills," and "developing human relation skills"

were all rated higher than 4.02 on the scale. The lowest rated experiential learning activity was "delegating responsibility" at 3.69.

The nature of this capstone course is, in fact, very experientially based. Class activities are structures such that students are empowered to make decisions, solve problems, and work in teams to analyze and solve farm management related problems. The highly beneficial nature of these activities, as rated by the respondents, is a positive reflection on the quality and durability of AgEdS 450. Further, it indicates the applicability of these activities, not only to this course, but to the career choices of its graduates.

Learning Activities and Instructional Techniques in a Capstone Course

As mentioned in the previous section, many factors influence the instructional techniques utilized in a course. Based upon the findings of this study, and in agreement with previous research, problem solving, committee work, decision-making, written and oral communication, and critical thinking skills were highly valued by questionnaire respondents. Across the board, regardless of the demographical variables used to analyze the data, the quality of the learning activities and instructional techniques in the course were rated above average to excellent on the 5-point Likert-type scale employed in this study.

The review of literature agrees on the types of instructional techniques and activities that should be employed in capstone courses (Zimmerman, 1991; Wagenaar, 1993; Aupperle & Sarhan, 1995; Crunkilton et al., 1997; Zimmerman, 1997). These activities, teamwork, problem solving, decision-making, critical thinking, and communication (Crunkilton, 1997), must be present in capstone courses to ensure that the summative benefits are available to these participants.

Because the capstone course, AgEdS 450, is experientially based, the learning activities and instructional techniques employed are hands-on and reflective in nature. Follow-up activities are used to assess the student's synthesis

and integration of the activities and techniques into the management of the Ag450 farm.

Respondents rated the learning activities and instructional techniques as being above average quality. Learning activities were rated from 3.42 to 4.10. "Participating in the management of the farm" was the highest rated activity, followed by "working with the farm staff to solve problems," the "election of class officers," "having a work experience on the farm," and "analyzing a strategic issue." These learning activities follow the prescribed activities for capstone courses as cited in Crunkilton et al. (1997) as well as adhering to the foundations of experiential learning (Kolb, 1984). The learning activities of "interacting with vendors" and "using ISU faculty and staff as speakers" were the lowest rated at 4.68 and 4.42, respectively.

The instructional techniques employed in this capstone course were recognized by respondents as being of equally high quality. These techniques focused on the facilitation of knowledge transfer within the course. Ratings for these techniques ranged from 3.14 to 4.40. Having the learning activities and instructional techniques in the setting of a "real farm laboratory" rated the highest among respondents. Likewise, "interacting with fellow students," "using classroom and laboratory activities," using committees in decision-making," "preparing and presenting oral reports," and "having outside speakers" were other highly rated instructional techniques. "Writing reports" and "using computers to collect data" were categorized as of "average" quality by respondents.

Farm Management Activities

Farm management activities are categorized into the following areas: livestock management, crop management, facility/equipment management, managerial activities, and financial management. These activities, though essential to the outcomes of the Ag450 farm, were not experienced by all students. Class committees are responsible for the management activities within their area.

Opportunities for interaction and exchange of ideas are routinely provided to course participants in the form of written and oral reports, inter-committee work groups, class business meetings, and strategic issue presentations.

Due, in part, to recent market upswings in corn, soybean, and hog prices, the Ag450 farm has enjoyed a new prosperity. Recent semesters have had to make some important decisions regarding machinery and equipment purchases and leases as well as new construction on the farm. As such, these recent semesters rated many of these activities higher than previous semesters. This may account for the differences in ratings on activities within the facility/equipment management variable. But regardless of the semester, committee assignment, major, or other demographic variables of the respondents, these management activities were appreciated and beneficial in the professional positions of its graduates.

Model for Incorporating Experiential Learning into Capstone Courses (MIELCC)

Based on the review of literature, the results of this research study, and researcher observations, a model for integrating experiential learning processes into capstone courses was developed. This model (MIELCC) draws upon the research and observations of educators in diverse fields of expertise but is oriented toward capstone courses in Colleges of Agriculture, although the benefits and applications of experiential learning and capstone course are universal.

Crunkilton et al. (1997) stated that one of the principal values of capstone course is to unify the fragmented disciplinary knowledge associated with the educative process. This model begins with this principle in mind. Crunkilton et al. further suggested five essential learning activities based upon their nation-wide analysis of capstone courses in Colleges of Agriculture. These activities are: problem solving, team work, decision-making, critical thinking, and oral and written communication.

The learning activities and instructional techniques included in the model's required capstone components are also the activities and techniques rated by the respondents of this study as being of exceptional quality and the most beneficial to them professionally. These learning activities and instructional techniques facilitate the experiential process within the capstone course.

The next section of the model is an interpretation of several experiential learning models (Kolb, 1984, Joplin, 1981, Pfeiffer & Jones, 1977) presented in the review of literature. The interpretation and its incorporation into the capstone course concept is the synthesis of this study and review of literature. The five "R's" of the model (receive, relate, reflect, refine, and reconstruct) are a mnemonic device to represent the major areas of the experiential learning model. They are designed to spiral and funnel the required capstone components into a synthesis and lead to an integration of the subject matter content.

Receive: An activity or experienced is received by the learner. This activity or experience may be contrived by the facilitator or may occur spontaneously during the capstone course or may have occurred during previous courses. This step correspond with previously cited models, many of them using the term "concrete experience" (Lewin, Piaget, Kolb, & CSREES).

Relate: Relating learned experiences to previously gained knowledge ties experiential learning into the capstone course philosophy. Taking fragmented disciplinary knowledge and unifying it is the intent of this step. This step may be referred to as "focus," "internalized reflection," reflective observation," "share," or "processing" in other models and is associated with reflect.

Reflect: Laura Joplin stated, "True experiential education is characterized by systematic interventions of the learning facilitator with the learner along an experiential path" (Joplin, 1981, p. 156). It is the reflecting upon the experiences received and relating them that distinguishes experiential learning from learning through experiences.

Refine: Once knowledge has been related to and reflected on it must be refined. This refinement process causes further contemplation concerning the applicability of this knowledge and its association to and with other knowledge. This may be associated with "abstract conceptualization" and "generalize" from other experiential leaning models.

Reconstruct: As the vortex of the spiral is reached, experiential learning reconstructs or allows for the synthesis of the subject matter content and its integration into our knowledge base. The Lewinian model calls this step "testing the implications of concepts in new situations" and the CSREES models refers to reconstruct as "apply what was learned to a similar or different situation or practice." Once synthesis and integration have resulted, the spiral of the five R's can be reused and additional knowledge processed and feedback provided and evaluations made to improve and develop the initial process.

Summary

There is a very real need to relate the concepts of capstone courses and experiential learning. Without this relationship the possibility exists of lessening the educational advantage students have by participating in capstone courses. Without an understanding of the experiential learning process, the surface of knowledge and learning are only scratched. The results of this study show that when learning activities and instructional techniques based upon the principles of experiential learning are applied in the capstone setting, the quality and benefits within these courses are improved.

Utilization of the Model for Integration of Experiential Learning into Capstone Courses (MIELCC) provides an actualization of the relationship between and among these educational principles. The Model provides one method of viewing these principles and incorporating them into a more holistic approach to education. Following the experiential learning process depicted in the five R's allows for

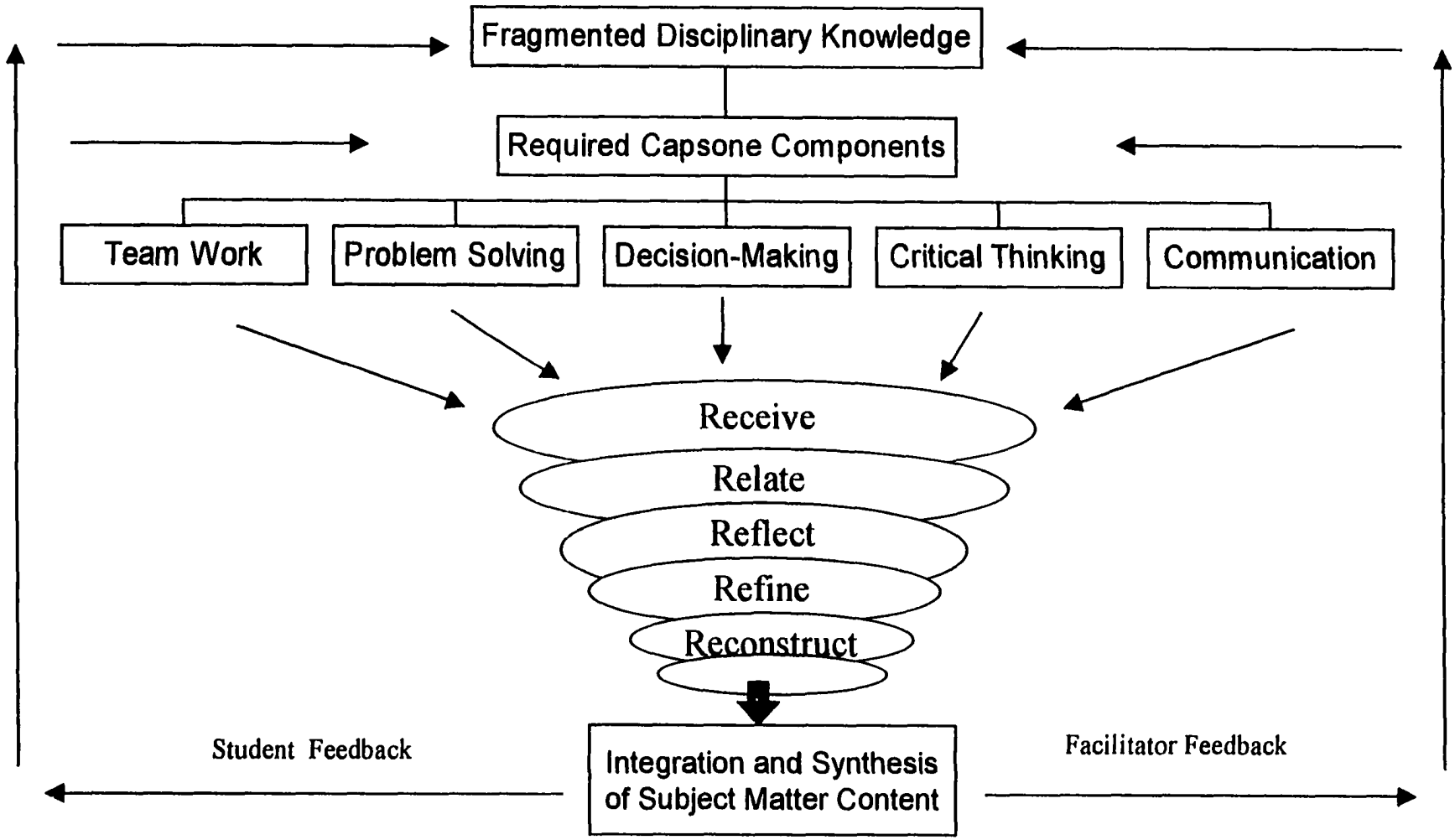


Figure 8. Integration of Experiential Learning into Capstone Courses (MIELCC)

improvements in education by improving the application and conceptualization of knowledge.

The alternative to ignoring these concepts, principles, and this model is to underutilize the tools and opportunities available to educators. Adherence to them is to improve education and learning for our students.

CHAPTER VI. SUMMARY, CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS

This chapter will provide a summary of the study, make conclusions based on the findings of the study, and offer recommendations to the profession. The chapter will include sections on: (a) purpose, (b) objectives, (c) methods, (d) findings, (e) conclusions, (f) recommendations, and (g) implications.

Purpose

The purpose of this study was to determine the perceptions of capstone course completers regarding the benefits and quality of selected experiential learning activities as they relate to the capstone course and to the respondents first professional position. Secondly, the study sought to use the usefulness of these activities to the instructional techniques and learning activities within the capstone course.

Objectives

The specific objectives of this study were to:

1. Describe the characteristics of capstone course completers.
2. Identify perceptions of program completers regarding selected educational concepts used in the capstone course.
3. Determine the quality of selected learning activities and instructional techniques by capstone course completers.
4. Identify strengths and weaknesses of capstone course as experiential learning resources.
5. Develop a model of experiential learning in capstone courses.

Methods

This study employed a descriptive survey design. This method allows for categorization of information from a variety of respondents. The population for this study consisted of all course completers enrolled in the capstone course, AgEdS 450, between Fall semester 1991 and Summer semester 1996, and which graduated from Iowa State University, and had current addresses on file with the ISU Alumni Foundation. A population of 335 was identified as course completers for the appropriate time frame of the study. An independent random sample was drawn from groups representing Agricultural Studies majors, Agricultural Education majors, and other majors enrolling in the course during the study time frame. A sample size of 214 was determined following the recommendations of Krejcie and Morgan (1970). There were 134 usable questionnaires returned resulting in a 63% return rate.

Respondents answered questions from a mailed survey containing four parts. Part I determined perceptions of respondents regarding the benefits of selected experiential and managerial variables employed in the capstone course, AgEdS 450, as they related to the respondents first professional position. Part II required the respondents to compare AgEdS 450 to other junior and senior level agricultural courses and to indicate whether the capstone course provided opportunities and interactions that were "less than," "equal to," or "greater than" those offered in AgEdS 450. Part III of the questionnaire consisted of fifteen questions asking the respondents to rate the quality of selected learning activities and instructional techniques utilized in the capstone course, AgEdS 450. Part IV asked the respondents to supply demographical information and included a section for written comments and suggestions.

The data were using the following statistical procedures: frequencies, means, standard deviations, rankings, t-tests, and analysis of variance.

Findings

Descriptive statistics were utilized to summarize the characteristics of respondents. This information is presented concerning respondents according to gender, undergraduate major, first professional position after graduation, semester enrolled in the capstone course, number of times enrolled, farm background, farm committee assignment while enrolled in AgEdS 450, and term and year of graduation.

The typical respondent was male (85%), came from a farming background (94%), majored in Agricultural Studies (71%), enrolled in the capstone course one time (84%) in the Fall semester (46%), served on one of the livestock committees (35%), and graduated between the Spring 1994 and Fall 1995 semesters (52%).

The following analysis of data is presented based on the respondents answers to the study instrument. The major findings of this investigation are:

1. All respondents agreed to strongly agreed that the experiential learning activities were beneficial to them in their first professional position after graduation. Experiential learning activities rating the highest were working as a team to solve problems, group decision-making skills, and the opportunity to exchange ideas. All scored 4.25 or higher. The grand mean for all experiential activities was 4.16.
2. Respondents indicated that livestock management activities were beneficial to them in their positions. Individual means for livestock management activities ranged from 4.07 to 4.18, with a grand mean of 4.11.
3. Respondents gave high marks to the benefits of facility and equipment management with regards to their first professional position. Means ranged from 3.81 to 4.50.
4. Respondents perceived the crop management activities as a beneficial educational experience. Individual means for crop management ranged from 3.94 to 4.17. The grand mean was 3.95.

5. Managerial activities relating to the capstone course, AgEdS 450 and to the Ag450 farm, were highly rated by course completers. Important managerial activities included solving production agriculture problems, identifying and solving management problems, making farm management decisions, analysis of farm records, and evaluating new technology. These individual means ranged from 3.16 to 4.24, with a grand mean of 3.90.
6. Respondents indicated that course activities were beneficial to them in their first professional position. Applying the knowledge gained from other courses rated the highest in this group with a mean score of 4.22, followed by preparing and presenting reports and developing respect for different ideas. The grand mean for course activities was 3.87.
7. The mean scores for financial management activities ranged from 3.59 to 4.22. The grand mean of 3.87 is the lowest reported for Part I, but indicates that respondents agreed with the benefits of these activities. Rating the highest as financial activities were record keeping and analyzing farm records, budgeting and planning, and financial management. These last three items had mean scores greater than 4.0.
8. Without exception, respondents indicated that the capstone course, AgEdS 450, provided "more, or greater than" opportunities and interactions than other junior or senior level agriculture classes taken by course completers. Rating extremely high were hands-on activities, student-student interaction, learning through experiences, and student-directed learning. Frequencies for this section ranged from 45% to 93% agreement.
9. Respondents indicated that the quality of the learning activities employed in the capstone course, AgEdS 450, were above average with a grand mean of 3.82. Learning activities were defined as course components requiring a hands-on approach. For learning activities, "participating in the

management of the farm" rated the highest, followed closely by "working with farm staff to solve problems."

10. The quality of the instructional techniques utilized in the instruction of the capstone course were rated above average by respondents. The grand mean was 3.85. Instructional techniques were defined as pedagogical methods utilized in the presentation of the course materials for the achievement of course objectives. Having a "real farm as a laboratory" and "interacting with fellow students" rated the highest as instructional techniques with ratings of 4.40 and 4.25, respectively.

Analysis of variance tests and the Schéffé post hoc analysis were run to identify significant differences among selected demographical variables and the perceived benefits of the capstone course. The major findings of these statistical analyses are as follows:

1. No significant difference was found in the benefits of the capstone course when grouped by gender. Similarly, no significant difference was observed by farm background. However, students with no prior farm background rated the benefits of experiential learning activities and course activities slightly higher.
2. A significant difference was found in the benefits of AgEdS 450 to respondent's first professional position when grouped by employment area. Respondents indicating teaching as their first position rated the experiential learning activities and the course activities significantly higher than respondents marking farming or other as their first position. Likewise, they tended to rate other categories, such as managerial activities, crop and livestock management, and financial management activities higher than the other two employment areas.
3. No significant difference was reported in the benefits of selected activities within AgEdS 450 when grouped by semester of enrollment.

4. A significant difference was found in the perceived benefits of selected course activities by term and year of graduation. Course graduates from spring semester, 1992 through fall semester, 1993 rated the experiential learning activities significantly lower than course graduates from spring semester, 1994 through fall semester, 1995. Likewise, this same group rated the experiential learning activities significantly lower than course graduates from spring semester, 1996 through fall semester, 1997 completers.
5. Regarding the experiential learning and course activities, even though there were no significant differences observed for some categories, the group means for the more recent graduates tended to be higher than the earlier graduates. This would suggest that the more recent graduates tended to value the perceived benefits slightly more than the earlier course graduates.
6. A significant difference was found in the perceived benefits related to facility and equipment management and term and year of graduation. This difference is likely due to the increased amount of capital improvements made on the Ag450 farm in recent years, as well as the newer line of equipment used in the farming practices.
7. Respondents indicated no significant difference in benefits of AgEdS 450 when grouped by farm committee assignment.
8. Significant differences were found in the benefits of experiential learning activities when grouped by major. Respondents indicating Agricultural Education as their major rated these activities significantly higher than did other majors.
9. No significant differences were indicated in the perceived quality of the learning activities and instructional techniques employed in the capstone course when grouped by gender and farm background.

10. Respondents indicated a significant difference in the quality of the instructional techniques by employment area. Respondents whose first professional position was teaching rated these techniques as being of higher quality than did respondents in employment areas of farming and other.
11. No significant difference was found in the quality of learning activities and instructional techniques when grouped by semester enrolled in AgEdS 450.
12. Significant differences were reported in the quality of learning activities and instructional techniques by term and year of graduation. The latest graduates of the capstone course rated these activities and techniques significantly higher than the earlier graduates.
13. No significant difference was indicated in the quality of learning activities and instructional techniques by farm committee assignment.
14. When respondents were grouped by major, a significant difference was observed in the perceived quality of instructional techniques. Agricultural Education majors rated the quality higher than did Agricultural Studies majors. No significant differences were found between Agricultural Education majors and other majors.

Conclusions

Based on the findings of this study, the following conclusions were made:

1. Respondents reflected the demographical variables indicative of course completers of AgEdS 450 and the Agricultural Education and Studies Department of Iowa State University.
2. Respondents indicated that they agreed that the experiential learning activities and managerial areas of the capstone course, AgEdS 450, were beneficial to them in their first professional position. This conclusion is

supported by Soomro (1991), who found that the content and procedures in AgEdS 450 were useful and beneficial to respondents.

3. When asked to compare the departmental capstone course to other junior and senior level agriculture courses they had taken, overwhelmingly respondents indicated that the capstone course, AgEdS 450, had greater amounts of important interactions and provided more opportunities for students.
4. Overall, the respondents rated the quality of the learning activities and the instructional techniques of the capstone course as above average. Being able to participate in the management of a farm and being able to use a real farm as a laboratory were important to students in the experiential learning process.
5. AgEdS 450 clearly fits the Crunkilton et al. (1997) definition of a capstone course. The expected educational outcomes (problem solving, decision-making, critical thinking, collaborative/professional relationships, oral communication, and written communication) as noted in the course syllabus, fit the criteria established by Crunkilton.
6. Kolb's model (1984) depicts experiential learning as a series of transitions among four adaptive modes: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Current learning and course activities, within AgEdS 450, incorporate these concepts and students transfer the knowledge gained through the course into learning experiences. This research supports that conclusion and is further supported by the benefits received by course completers relative to experiential activities and course activities.
7. Since few significant differences were found regarding the learning activities and instructional techniques employed in the capstone course, AgEdS 450, it can be concluded that these activities are appropriate and beneficial to course completers.

8. Additionally, since few significant differences were found regarding the experiential learning and course activities in AgEdS 450, it can be concluded that these experiences and activities are beneficial to capstone course completers.
9. Based upon the results of the study, the Model for Incorporating Experiential Learning into Capstone Courses (MIELCC) can be a prototype for the integration of experiential learning and capstone courses in other College of Agriculture courses.
10. Comments and suggestions by the respondents indicated their fondness for the AgEdS 450 course and the Ag450 farm. This conclusion is supported by the findings of Soomro (1991) that over 90% of course completers indicated they would enroll in AgEdS 450 again.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are made by the researcher:

1. The AgEdS 450 course provides a unique educational experience to its participants combining the foundation skills of experiential learning and essential components of capstone courses that should be required of all departmental majors.
2. Strengthen the student/teacher interactions of the capstone course and provide constructive feedback options to students based on course objectives.
3. Material previously learned in other related disciplines must be built upon and added to in this capstone course.
4. Record keeping and financial responsibility should be emphasized and more readily incorporated into the learning activities and instructional techniques employed in this course.

5. Utilize the Model for the Integration of Experiential Learning into Capstone Courses (MIELCC) as a guide for monitoring and evaluating this and other capstone courses.
6. Further study should be conducted to determine the utility of the proposed model through all disciplines employing capstone courses.

Implications

Implications can be drawn from this study and applied to capstone courses in Colleges of Agriculture. The findings of this study along with the review of literature give a clear view of the importance of learning activities and experiential learning to capstone courses. Each component serves as an integral part of the entire process. Capstone courses are prevalent among all disciplines in colleges and universities across the nation. They provide an opportunity to incorporate previously learned, often disjointed, information into an interconnected contextual frame of reference from which to transition into a career or further study (Crunkilton et al., 1997).

While care should be used in generalizing the results and findings of this study, certain key elements hold true for all experientially based capstone courses. They are that capstone courses must contain the components indicated in the Model for the Integration of Experiential Learning into Capstone Courses and use the five R's to continually process and evaluate the learning which takes place. It is often these steps (the five R's) which are omitted from the learning process. Care must be exercised and precautions taken to ensure that capstone courses are truly the summative educational experience for our students.

APPENDIX A. HUMAN SUBJECTS APPROVAL

Last Name of Principal Investigator Andreasen

Checklist for Attachments and Time Schedule

The following are attached (please check):

12. [Y] Letter or written statement to subjects indicating clearly:
    a) purpose of the research
    b) the use of any identifier codes (names, #'s), how they will be used, and when they will be removed (see Item 17)
    c) an estimate of time needed for participation in the research and the place
    d) if applicable, location of the research activity
    e) how you will ensure confidentiality
    f) in a longitudinal study, note when and how you will contact subjects later
    g) participation is voluntary; nonparticipation will not affect evaluations of the subject

13. [ ] Consent form (if applicable)

14. [ ] Letter of approval for research from cooperating organizations or institutions (if applicable)

15. [X] Data-gathering instruments

16. Anticipated dates for contact with subjects:

First Contact	Last Contact
November 1, 1997	January 20, 1998
Month / Day / Year	Month / Day / Year

17. If applicable: anticipated date that identifiers will be removed from completed survey instruments and/or audio or visual tapes will be erased:

May 15, 1998
Month / Day / Year

18. Signature of Departmental Executive Officer | Date | Department or Administrative Unit

Edward L Carter RFM | 10-17-97 | Agricultural Education and Studies

19. Decision of the University Human Subjects Review Committee:

X Project Approved ___ Project Not Approved ___ No Action Required

Patricia M. Keith | 10/24/97 | PM Keith

Name of Committee Chairperson | Date | Signature of Committee Chairperson

GC: 8/95

APPENDIX B. COVER LETTER AND DATA COLLECTION INSTRUMENT

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Department of Agricultural Education and Studi
201 Curtiss Hall
Ames, Iowa 50011-1050
Administration and Graduate Programs 515 294-
Research and Extension Programs 515 294-5872
Undergraduate Programs 515 294-6924

DATE

FIELD(name) FIELD(last)
FIELD(address)
FIELD(city, state zip)

Dear FIELD(name):

The Ag450 Farm has achieved a number of mile stones during the past few years. From our 50 year anniversary to the recent completion of our new 1200 head finisher, many new and exciting events have occurred. As alumni of the Ag450 Farm you are in an excellent position to aid us in continuing the tradition of excellence of which you were apart.

FIELD(name), as you know, the AgEdS 450 course is unique. It serves as the department's capstone course and as such we are always concerned with the educational value our students receive. Certain learning activities and instructional techniques are being reviewed to allow for continual improvement in this very important class.

Please take a few minutes to complete the enclosed, voluntary, questionnaire and return it as soon as possible in the postage-paid return envelope. The codes on the form will only be used for tracking the questionnaire, your name will not be associated with any response and will be removed at the conclusion of the study.

It is because of students like you FIELD(name) that the AgEdS 450 course has been successful in preparing its graduates for careers in agriculture. Please assist us in continuing this outstanding tradition by completing and returning your form in the next few days.

Thank you in advance for your cooperation. The results of the questionnaire will be placed on the Ag450 Farm homepage (http://www.ag.iastate.edu/departments/aged/). We encourage you to stay in touch.

Sincerely,

Dr. Larry D. Trede
Professor-in-Charge
Agricultural Education & Studies
Iowa State University

Randall J. Andreasen
Teaching/Research Assistant
Agricultural Education & Studies
Iowa State University

Please indicate the extent to which you agree with the following statements regarding how **beneficial** AgEdS 450 was as an educational course preparing you for your first agricultural professional position.

Key
SD = Strongly Disagree
D = Disagree
U = Undecided
A = Agree
SA = Strongly Agree

Part I

Statements	(Circle one)
1. The AgEdS 450 course provides students the opportunity to study new agricultural practices.	**SD D U A SA**
2. The AgEdS 450 course enables students to solve problems related to production agriculture.	**SD D U A SA**
3. Students are encouraged to evaluate new technology related to production agriculture.	**SD D U A SA**
4. The AgEdS 450 course teaches students to identify and solve farm business management problems.	**SD D U A SA**
5. Group decision-making skills are developed as part of the AgEdS 450 course.	**SD D U A SA**
6. Students in the AgEdS 450 course are taught to make farm management decisions.	**SD D U A SA**
7. Students in the AgEdS 450 course assume responsibility for managing the Ag450 Farm.	**SD D U A SA**
8. Students are challenged to work with agribusinesses in the AgEdS 450 course.	**SD D U A SA**
9. Students are expected to work as team members to solve problems.	**SD D U A SA**

Note: **SD** = Strongly Disagree; **D** =Disagree; **U** = Undecided; **A** = Agree; **SA** = Strongly Agree

10. Class committees are an effective part of the AgEdS 450 course.	SD D U A SA
11. The opportunity to exchange ideas is valuable to students in the AgEdS 450 course.	SD D U A SA
12. Students are empowered to assume responsibility for their own learning.	SD D U A SA
13. Preparing and presenting reports in the AgEdS 450 course is valuable .	SD D U A SA
14. The AgEdS 450 course facilitates the development of human relation skills.	SD D U A SA
15. Students in the AgEdS 450 course develop respect for different opinions and ideas.	SD D U A SA
16. The AgEdS 450 course allows students to apply the knowledge gained from other courses.	SD D U A SA
17. A variety of assessment procedures are used to evaluate students' achievement.	SD D U A SA
18. The AgEdS 450 course aided me in formulating my agricultural philosophy.	SD D U A SA
19. Students in the AgEdS 450 course learn to delegate responsibility.	SD D U A SA
20. Students are encouraged to use farm records to make management decisions.	SD D U A SA
21. Students in the AgEdS 450 course are encouraged to seek information from extension personnel and ISU staff.	SD D U A SA
22. The AgEdS 450 course encourages students to consider environmental factors in making farm decisions.	SD D U A SA
23. Students are encouraged to consider the "sustainability" of farm resources when making decisions.	SD D U A SA

Please continue ✏

Note: **SD** = Strongly Disagree; **D** =Disagree; **U** = Undecided; **A** = Agree; **SA** = Strongly Agree

24. Students are able to deal with health and safety issues concerning farm employees.	**SD D U A SA**
25. AgEdS 450 students are encouraged to develop alternatives to solve problems.	**SD D U A SA**
The AgEdS 450 course provides students the opportunity to analyze and solve problems in the following areas:	
26. Livestock care.	**SD D U A SA**
27. Livestock breeding.	**SD D U A SA**
28. Livestock marketing.	**SD D U A SA**
29. Crop management.	**SD D U A SA**
30. Soil conservation and water management.	**SD D U A SA**
31. Crop marketing.	**SD D U A SA**
32. Farm equipment repair, maintenance and operation.	**SD D U A SA**
33. Farm equipment selection.	**SD D U A SA**
34. New building planning, design and construction.	**SD D U A SA**
35. Building repair and maintenance.	**SD D U A SA**
36. Keeping and analyzing farm records.	**SD D U A SA**
37. Managing the financial affairs of the farm.	**SD D U A SA**
38. Farm budgets and plans.	**SD D U A SA**
39. Farm employee management.	**SD D U A SA**
40. Leasing and/or purchasing of land.	**SD D U A SA**

Part II.

When compared to **other** junior and senior level agricultural courses, the AgEdS 450 course **(Circle A, B or C) :**

(1)	A. emphasized goal-setting *less*	B. emphasized goal-setting *equally*	C. emphasized goal-setting *more*
(2)	A. provided *less* hands-on activities	B. provided *equal* hands-on activities	C. provided *more* hands-on activities
(3)	A. had *less* amount of teacher-student interaction	B. had *equal* amounts of teacher-student interaction	C. had *greater* amount of teacher-student interaction
(4)	A. taught *less* problem-solving/decision-making skills	B. taught *equal* problem-solving/decision-making skills	C. taught *more* problem-solving/decision-making skills
(5)	A. provided *less* learning through experiences	B. provided *equal* learning through experiences	C provided *greater* learning through experiences
(6)	A. relied *less* on material learned previously in other courses	B. relied *equally* on material learned previously in other courses	C. relied *more* on material learned previously in other courses
(7)	A. had *less* amount of student-student interaction	B. had *equal* amount of student-student interaction	C. had *greater* amount of student-student interaction
(8)	A. offered *fewer* opportunities to plan activities	B. offered *equal* opportunities to plan activities	C. offered *more* opportunities to plan activities
(9)	A. provided *less* opportunities to put course objectives into practice	B. provided *equal* opportunities to put course objectives into practice	C. provided *more* opportunities to put course objectives into practice
(10)	A. offered *less* student-directed learning	B. offered *equal* student-directed learning	C. offered *more* student-directed learning

Please continue ✏

Part III.
Please rate the following learning activities and instructional techniques as they relate to the quality of the AgEdS 450 course.

Key
1 = Poor
2 = Below Average
3 = Average
4 = Above Average
5 = Excellent

Learning Activities and Instructional Techniques	(Circle one)
1. Analyzing and solving a "strategic issue" affecting the farm.	1 2 3 4 5
2. Utilizing both classroom and laboratory activities.	1 2 3 4 5
3. Having outside speakers present informational topics.	1 2 3 4 5
4. Contacting and interacting with vendors.	1 2 3 4 5
5. Using a real farm as a laboratory.	1 2 3 4 5
6. Electing officers to provide class leadership.	1 2 3 4 5
7. Using committees to facilitate class decision-making.	1 2 3 4 5
8. Participating in the management of the farm.	1 2 3 4 5
9. Working with farm staff to solve problems.	1 2 3 4 5
10. Utilizing computer technology to collect and analyze data.	1 2 3 4 5
11. Interacting with fellow students in the decision-making process.	1 2 3 4 5
12. Preparing and presenting oral reports to the class.	1 2 3 4 5
13. Developing written reports.	1 2 3 4 5
14. Having ISU faculty and staff as speakers.	1 2 3 4 5
15. Extra hours required as work experience on the farm.	1 2 3 4 5

Part IV

1. What was your first professional position after graduation? **(Circle one)**

   Teaching **Farm Management (family operation)**

   Farm Management (non-family operation) **Agribusiness Management**

   Sales and Service **Extension**

   Other (please specify)_____

2. What is your current profession?_____

3. Which month and year did you receive your B.S. from ISU?_____

4. Which semester(s) were you enrolled in AgEdS 450? **(Circle one) Fall Spring Summer**

5. How many times did you take AgEdS 450? **(Circle one) 1 2 3**

6. In your opinion, did you have a farm background before enrolling in AgEdS 450? **(Circle one)**

   no yes

7. Your gender? **(Circle one)** **male** **female**

8. Your major while enrolled in AgEdS 450 was: **(Circle one)**

   Agronomy **Animal Science** **Pre-Vet** **Ag. Education**

   Ag. Systems Tech. **Ag. Business** **Ag. Studies**

   Other (please specify)_____

9. Did you hold a class office while in AgEdS 450? **(Circle one) no yes**
   Office held:_____

10. What was your committee assignment while enrolled in AgEdS 450?_____

11. Other comments or suggestions you might have regarding the AgEdS 450 course:

APPENDIX C. POSTCARD REMINDER AND FOLLOW-UP LETTER

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Date: November 20, 1997
To: Selected Ag450 Farm Alumni
From: Randy Andreasen

A few days ago I sent you a questionnaire concerning your evaluation of certain instructional techniques and procedures which are used in the instruction of the AgEdS450 course. As of yet, I have not received your completed questionnaire. As you know, the AgEdS450 course provides a valuable link between education and practice. Please take a few minutes and complete the questionnaire. Your response is very important to us and will allow us to continue to provide valuable and current instruction. If you have already sent in you completed questionnaire, please accept my sincere appreciation. If you have any questions, or need another questionnaire, please contact me as (515) 294-0047 or by e-mail at randreas@iastate.edu.

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Department of Agricultural Education and Studies
201 Curtiss Hall
Ames, Iowa 50011-1050
Administration and Graduate Programs 515 294-59
Research and Extension Programs 515 294-5872
Undergraduate Programs 515 294-6924

February 25, 1998

«First» «Last»
«Address1»
«Address2»
«City», «State» «Zip»

Dear «First»:

A couple of weeks ago you were mailed a questionnaire dealing the experiences and educational opportunities you received through the AgEdS 450 course. To this date, I have not received your completed questionnaire.

As you realize, AgEdS 450 is a unique course which provides an experiential opportunity for junior and senior students in a capstone setting. Your responses to this questionnaire are vital in maintaining and improving this course. Your responses are held in strict confidence and are only used to track who has or has not responded.

I have enclosed another questionnaire in the event that the original was lost in the mail or otherwise misplaced. Please take a few moments and complete this questionnaire and return it in the enclosed, postage-paid envelope. If you have already completed and returned it, please accept our sincere gratitude. As a reminder, the survey results will appear on our newly revised web page at: http://www.ag.iastate.edu/departments/aged/. If you have any questions, please do not hesitate to contact us at (515) 294-0047 or e-mail me at randreas@iastate.edu.

Thank you for your cooperation and have a happy holiday season.

Sincerely,

Randall J. Andreasen
Teaching/Research Assistant

Larry D. Trede
Professor-in-Charge

APPENDIX D. RESPONDENT COMMENTS AND SUGGESTIONS

The following are respondent comments and suggestions from Part IV, question 11 of the survey instrument. The comments are written as entered with the exception of spelling errors.

This course is very beneficial to students without a farm background. Which there are more and more students that have no, or very little experience in farming today.

Continue to encourage as much participation as possible. Make sure committees are democratic and that there isn't a "Hitler" ruling the whole thing. Fight for funding to continue the 450 farm. I considered it a fun and valuable class.

If a real farm was run like the 450 Farm, it would have been sold out years ago.

It was fun!

The 450 class should be more of a challenge and demand more from its students. The class was a little too relaxed when I took it. It does give students the opportunity to learn and to be as involved as they wish to be.

We were $10,000.00 in the red and had most of the inputs given to us.

Excellent Course.

I felt that this was a great course. However I feel that this needed to be at least a two semester deal. The way it was laid out before I don't feel that we got a good feel of the actual "management" problems that can/could occur.

It's a great course.

ISU is the premier ag school in the mid west. Therefore if ISU is going to train our farmers and feel that they should learn from a "state of the art" facility and not from one that has been stuck in the seventies. I realize that funding can be a problem and that the 450 Farm is intended to be self financed, but facilities and equipment drastically needs to be updated. Agriculture is the largest industry in Iowa yet the ISU College of Ag has the most outdated facilities! I also feel that the students should be allowed to manage the farm, but should have a leader or farm manager who has operated a successful farm to help guide them in their decisions.

This was a very good class. Keep up the good work!

From what I have read, it sounds as if the farm has improved technology and updated facilities since I took the class. I loved Ag Ed 450 and also enjoyed our trip to the Farm Progress Show. Keep up the good work.

Keep it going. Great experience.

Implementing ISU new Database for crops. Letting the students do more work. Limit the instructor decision making.

Keep up the good work.

At the time I took this course there seemed to be a need for more continuity between semester classes and their management decisions.

More required time or courses to learn and work other/all parts of farming operation. By the time I was able to get into Ag Ed's 450, I was ready to graduate. I wished I could have gone back and also done livestock.

I would have liked to have had the opportunity to be in a different committee, to lean how other parts of the farm were run. This would've come from a second semester or changing in mid semester.

The greatest asset of this course is the problem solving skills that are learned and refined.

While I was enrolled there was no records available. And we did no record keeping of our own. There wasn't any new technology being used.

The 450 class was an excellent "on-hands" course that taught you to work together and make critical farm management decisions.

Needs to be a year long class, fall through spring.

Invite in Ag teachers and their administration to see first hand Agricultural teaching at its best.

When I took the class there were only six students total and the instructor was on his way out. So the class did whatever we wanted. We had no regard for the class after us, and the decisions we made, were made without the next class in mind. That is the whole problem with the class. Students only take it for a few months, do what they want and don't have to live long term with the decisions they make. If possible, the class should be a full year responsibility, students make decisions in the spring, come back and have to deal with them

again in the fall. That's the way it is every day in farming today. The best thing the farm has going for it when I was there was Greg Vogel (farm manager). He worked well with the students and worked hard. I hope he is still there. He did a great job when I was there.

I think more people would like this course if they knew about it.

As you can tell I enjoyed and learned from this class. One suggestion: more work with computers and data. Ag. Business encouraged a little more.

The committee structure at times was questionable, but I can't think of a better way to divide the work and decision making responsibilities. I visited recently and I was pleased to see that the buildings and grounds were cleaned up and more organized. Sustainablilty and concern for the environment are important, but I think ISU needs to move into the next century realizing that the "family farm" is not what it once was. Farming is a business and bigger is not a dirty word. The Ag Ed's 450 Farm should be at the forefront of this future at production agriculture.

Good class.

I think it is a wonderful hands on experience.

Excellent class. Provided me with some real world experience and responsibility.

Students do not get the "full effect" with only one semester. If he/she did not grow up on a farming operation, they don't understand the responsibility.

Cattle would be a good learning experience. I know it is not a cattle area, but some of us came from cattle background and want to learn more. The staff at the 450 Farm was great to work with.

I had a lot of interacting with the other students, teachers and farm management.

I think that Ag 450 should be diversified in the livestock especially. I didn't know much about hogs when I started 450 but it taught me a lot. I think that the same should be done with cows on feeder cattle for the people that don't know much about the cattle business.

It was a very good class! The best way to learn is hands on, learning how to do things as you do them.

Should be required to take at least two semesters.

Give a chance to spend a day on a different committee.

A better record keeping system for following classes. Grid sampling information would provide valuable information for decision making. Would help following classes get up to speed.

It should be required as a two semester course. I semester is simple dealing with previous semester problems, etc., etc. With two semester requirement, students would deal with problems that they created and/or see positive things which they started.

Thought emphasis put on hogs was too high. There are other alternatives in Agriculture that need to be looked at. Diversity is the key to future.

I like the idea behind the student run farm but am not sure I agree with how it is done. I realize things are done for educational purposes and not always for economic reasons. I feel the greatest educational potential with the 450 farm would be to teach students how to run a farm and survive. There was not enough emphasis on our financial records. We needed to learn how to find our costs. Are we profitable? Do we need to make changes? What and how should we change? Was the new finishing building the thing to build? I've read one reason for it is to expose students to more modern hog facilities. How often can the farm spend $256,000 to do that? Many are building huge swine production facilities in the world. Are they profitable? I am finding out that many of them are being put up by people who went broke before and had many dollars of debt forgiveness. Now that I am on my own I am having trouble competing with these people. Please teach students how to survive in the real world and to take responsibility for their actions.

I was somewhat disappointed with the technology on the farm. I thought the university is supposed to be the leader in technology.

A tremendous experience.

My experience was that a few "farm" kids ran the show and we were just around to be there.

This class was fun. The students had real life responsibilities and duties. Hope to see this course continue to grow and profit.

The only problem I remembered with Ad Ed's 450 was there were too many students taking it. Each committee should not consist of more than five or six students. Very good course.

Keep it!! Definitely a plus for farm and non-farm students.

I would like to see more about GPS. It would make sense to have the farm have the actual equipment and show the students how to use and understand it. A few cattle would be beneficial, as it is an educational farm and should deal with all aspects of agriculture, not just hogs. Some of the farming practices and equipment seem out of date and don't reflect some of the major trends of soil conservation and herbicide programs. I realize the farm is on a limited budget and would think that more effort should be put forth to encourage some of the equipment dealers and ag retailers to donate or discount some of the products or services. I would bet many companies would like to demo their products in front of the next generation of farmers.

I think it is hard to have a definite strategy for the future with different students coming in. I would suggest having a group oversee farming operations made up of teachers and students that make final decisions and serve on this committee for several years.

I felt that the greatest experience is working in your committees. It develops P.R. skills, enhances team work, problem solving, etc. That is where I felt I did my best.

Try to put students on committees that they haven't had the experience on. For example: someone who is familiar with livestock should be put on the crops committee. The point of the class is to learn new practices, not to do things you're used to doing.

Keep the class alive, because it offers students the ability to practice classroom theories and experience how they affect the farm.

It was an excellent opportunity for students, but it may be "buttered up" a little compared to farming on your own without university assistance.

Really enjoyed the course. Encourage everyone in Ag. department to take course. Real sense of team leadership through the semester.

Ag Ed's 450 was one of my favorite classes at ISU. It was a very practical course and provided a much needed relief from the normal class setting. I would recommend it to anyone. Although it would have been nice to be

involved in more areas of the operation if possible. I like to see updates on how the farm is doing.

I enjoyed the course and am glad they are making progress.

Students need to discuss reasons for decisions more and evaluate consequences.

Keep it going. One of the better courses I took while at ISU.

Encourage participation from all classmates.

I did not think the farm was very modern for being a class in one of the top agricultural colleges in the nation.

While being the Treasurer of the class I was not able to do some of the other activities that I would have liked to do. However, due to credit restrictions I was unable to take the class again.

Running a farm is a long term year to year job. Students coming in for one semester only get part of the experience. The goals and objectives of each class is different which changes the farm operations several times in one season. That won't work in real farming. That makes the class hard and the farm manager job impossible.

The class need to emphasize more on educating new technology more than being concerned about profit. 450 would not buy a GPS unit for education because it wouldn't pay for itself, 450 is a class...not a business.

I liked the class. Learned a lot.

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ACKNOWLEDGMENTS

The completion of this dissertation and my doctoral program are the concerted efforts of several individuals. I wish to express my thanks and appreciation to those who have helped me make this dream a reality.

Dr. Larry Trede, for his guidance and assistance as my major professor and supervisor of my assistantship. His hard work and encouragement were sincerely appreciated and the lessons I learned from him go beyond academic pursuits.

Dr. Robert Martin, who served as a committee member and director of graduate education for the department, for providing me with encouragement and leadership.

Dr. Wade Miller, for his kind words and friendship. You provided me with insight into problems associated with my studies and in life in general.

Dr. Mark Honeyman, for your help and encouragement. Your understanding of the Ag 450 Farm was appreciated and very useful.

Drs. Morfew, Warren, and Allen, for serving as committee members at various times during my doctoral program. Each of you imparted a unique perspective and insight into the questions posed in this study.

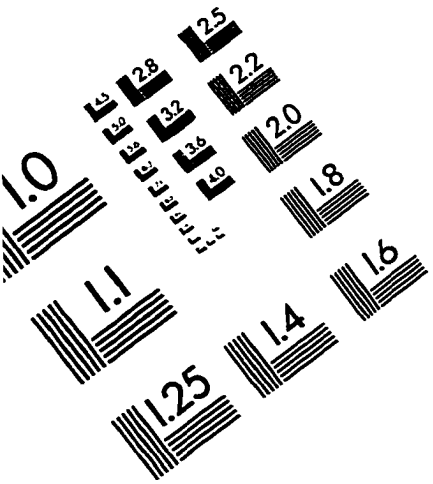
Dr. Jim Dyer, your efforts and words of wisdom on my behalf can never be fully repaid. You helped me be a better student, researcher, and professional. You treated me as a colleague and equal and set an example for me which I hope to duplicate in my associations as a university professor.

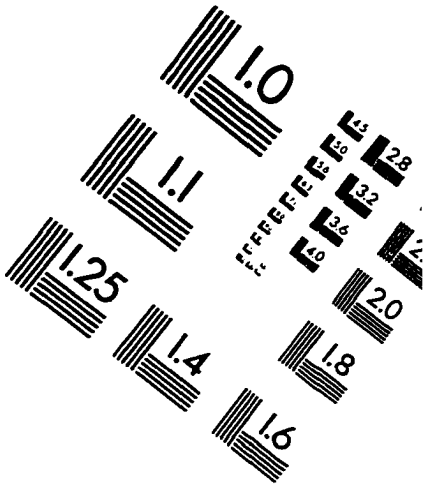
Gina Holtzbauer, Greg Vogel, and the crew in 206 Curtiss, you were the breath of life during this hectic two years. Your friendship, listening ear, and unselfish help were and are greatly appreciated.

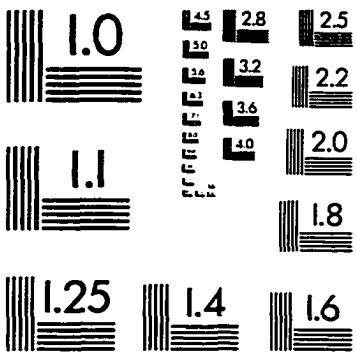
I wish to thank my parents, Dr. James and Barbara Andreasen, and siblings, Grant, Rick, Amy, and Emily, for their uncompromising love and support. Your examples set the stage for this achievement.

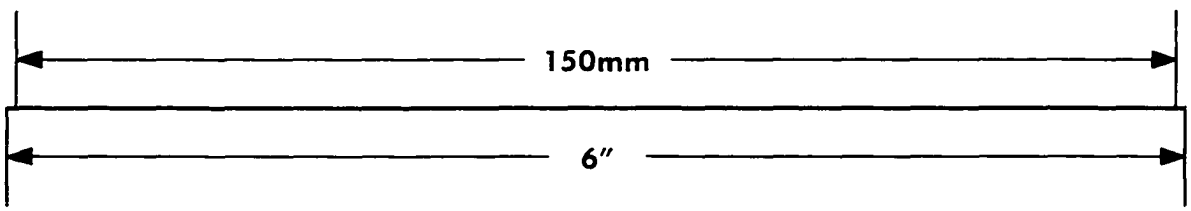
And finally, I want to express my love and gratitude to my best friend and eternal companion, Bonnie, and my children, Monty, Tyrel, Ivy, Lane, and Mattie. Thanks kids, for your love and patience. Bonnie, you are truly my better half and are a major part of everything I have achieved. Thank you for so many things that words cannot do justice to.

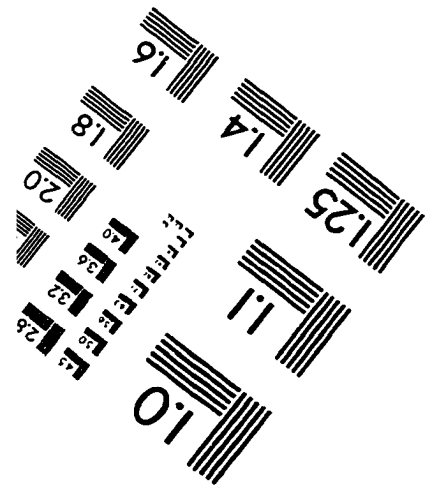
IMAGE EVALUATION TEST TARGET (QA-3)

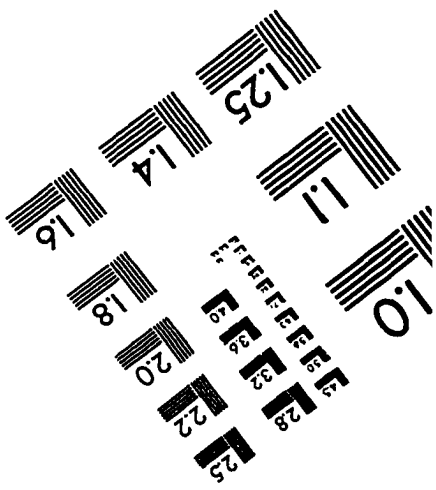












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